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## Agromyzidae (Diptera) in Chile

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With 118 figures



### Summary

The Agromyzidae have hitherto been poorly known in Chile, with only 21 species in 7 genera recorded. Following a two months' visit to Chile in 1978, material then collected and also earlier collections now in the California Academy of Sciences, San Francisco and the Canadian National Collection, Ottawa have now been studied. 36 new species are described in the genera *Melanagromyza*, *Ophiomyia*, *Cerodontha*, *Liriomyza*, *Galiomyza*, *Calycomyza*, *Phytoliriomyza* and *Phytomyza*. Keys are provided to the 12 genera and 73 species now known in Chile.

The Agromyzidae have been found to occur even at the highest elevations above 4000 m and in the extreme south in Tierra del Fuego. The largest genera are *Liriomyza*, *Melanagromyza* and *Phytoliriomyza*. Leafmines were found on 40 hosts and the important pest species, *Liriomyza sativae*, is recorded as new to Chile, feeding primarily on *Medicago sativa* (alfalfa).

### Zusammenfassung

Mit nur 21 Arten aus 7 Gattungen sind die bisherigen Kenntnisse über chilenische Agromyzidae recht gering. Anhand von Material, das der Autor während einer 2monatigen Reise in Chile gesammelt hat, sowie Tieren aus Sammlungen der California Academy of Sciences (San Francisco) und der Canadian National Collection (Ottawa), werden 36 neue Arten aus den Gattungen *Melanagromyza*, *Ophiomyia*, *Cerodontha*, *Liriomyza*, *Galiomyza*, *Calycomyza*, *Phytoliriomyza* und *Phytomyza* beschrieben. Von den jetzt 73 aus Chile bekannten Arten, die sich auf insgesamt 12 Gattungen verteilen, werden Bestimmungsschlüssel erarbeitet.

Vertreter der Dipteren-Familie Agromyzidae wurden sowohl in 4000 m Höhe nachgewiesen als auch in den südlichsten Bereichen Chiles, in der Tierra del Fuego. Erstmals konnte die als Schädling bekannte *Liriomyza sativae*, die in erster Linie auf *Medicago sativa* lebt, auch in Chile nachgewiesen werden. Etwa 40 Wirtspflanzen, auf denen ein Teil der hier behandelten Blattminierer lebt, werden genannt. Die meisten der jetzt aus Chile bekannten Arten verteilen sich auf die Gattungen *Liriomyza*, *Melanagromyza* und *Phytoliriomyza*.

## Contents

1. Introduction . . . . .	2
2. Materials and methods . . . . .	3
3. Key to subfamilies and genera of Chilean Agromyzidae . . . . .	4
4. Descriptions of genera and keys to species of Chilean Agromyzidae . . . . .	5
4.1. Genus <i>Melanagromyza</i> Hendel . . . . .	5
4.2. Genus <i>Ophiomyia</i> Braschnikov . . . . .	10
4.3. Genus <i>Agromyza</i> Fallén . . . . .	12
4.4. Genus <i>Amauromyza</i> Hendel . . . . .	12
4.5. Genus <i>Cerodontha</i> Rondani . . . . .	14
4.6. Genus <i>Liriomyza</i> Mik . . . . .	17
4.7. Genus <i>Galiomyza</i> Spencer . . . . .	28
4.8. Genus <i>Haplopeodes</i> Steyskal . . . . .	28
4.9. Genus <i>Calycomyza</i> Hendel . . . . .	30
4.10. Genus <i>Phytoliriomyza</i> Hendel . . . . .	31
4.11. Genera <i>Phytomyza</i> Fallén and <i>Chromatomyia</i> Hardy . . . . .	34
5. Descriptions of new species of Chilean Agromyzidae . . . . .	37
5.1. Genus <i>Melanagromyza</i> Hendel . . . . .	37
5.2. Genus <i>Ophiomyia</i> Braschnikov . . . . .	40
5.3. Genus <i>Cerodontha</i> Rondani . . . . .	41
5.4. Genus <i>Liriomyza</i> Mik . . . . .	43
5.5. Genus <i>Galiomyza</i> Spencer . . . . .	49
5.6. Genus <i>Calycomyza</i> Hendel . . . . .	50
5.7. Genus <i>Phytoliriomyza</i> Hendel . . . . .	50
5.8. Genus <i>Phytomyza</i> Fallén . . . . .	53
6. Acknowledgments . . . . .	54
7. References . . . . .	54

## 1. Introduction

Little information has hitherto been available on Agromyzidae in Chile. The first species to be described was *Cerodontha* (as *Micromma*) *flavifrons* (Philippi 1865), a widespread and common species in south-central Chile, followed by *Phytomyza melanogaster* Thomson 1868 from Tierra del Fuego. PORTER (1915) described *Agromyza* (= *Liriomyza*) *gayi* from Santiago but unfortunately the type is lost and the species cannot be identified. He also recorded *Liriomyza huidobrensis* (PORTER 1939) on potato, previously identified on tomato as „*Agromyza signata* Meigen“ (PORTER 1936). Ten species from southern Chile were described by MALLOCH (1934), based on the EDWARDS British Museum Expedition to Patagonia in 1926 (cf. EDWARDS in ALEXANDER 1929). In a synopsis of Neotropical Agromyzidae SPENCER (1963) partially revised MALLOCH's species and one new species, *Melanagromyza praeclara*, was described. Two new species were described and three more identified from the Juan Fernandez Islands by SPENCER (1964) and SHEWELL (1967) recorded two species from Easter Island. AGUILERA (1972) gave a detailed biological study of *Liriomyza huidobrensis* in the Arica area (as *L. langei*) and GONZÁLEZ et al. (1973) referred to 7 species as pests of cultivated plants. Of these, two — *Cerodontha denticornis* and *Liriomyza flaveola*, both exclusively Palaearctic species — represent misidentifications.

In all only 21 species in 7 genera have previously been known in Chile. 36 new species are now described and 16 more are recorded as new to Chile, making the total thus 73 in 12 genera. The generic breakdown is shown in Table 1. The fauna is

Table 1. Genera of Chilean Agromyzidae.

	New	New to Chile	Total
<i>Melanagromyza</i> Hendel	6	4	14
<i>Ophiomyia</i> Braschnikov	4	1	5
<i>Agromyza</i> Fallén	—	—	1
<i>Amauromyza</i> Hendel	—	1	2
<i>Cerodontha</i> Rondani s. l.			
<i>Cerodontha</i> Rondani s. str.	3	1	5
<i>Icteromyza</i> Hendel	—	—	1
<i>Butomomyza</i> Nowakowski	1	—	1
<i>Liriomyza</i> Mik	12	3	23
<i>Galiomyza</i> Spencer	1	—	1
<i>Haplopeodes</i> Steyskal	—	1	1
<i>Calycomyza</i> Hendel	1	2	3
<i>Phytoliriomyza</i> Hendel	6	1	10
<i>Phytomyza</i> Fallén	2	1	5
<i>Chromatomyia</i> Griffiths	—	1	1
Total	36	16	73

characteristically depauperate as in other areas of the southern hemisphere; by contrast over 300 species are known in England and 550 in the United States.

ARTIGAS (1975) gave a detailed analysis of the distribution of 903 species of animals in Chile, including 530 insect species and produced a map divided into five areas and 31 zoogeographic zones. However, such distributional fragmentation has little relevance as far as the Agromyzidae are concerned. They are weak fliers, yet remarkably mobile due to passive dispersal by wind, and individual species can have a surprisingly wide range and altitudinal tolerance, occurring from sea level to 2000 m or more. The family is still not well enough known in Chile to discuss distribution of individual species in detail. Some may have a restricted range in high elevation mountain areas, others, such as *Phytomyza melanogaster* and *Cerodontha magellani* sp. n. are probably restricted to southern Patagonia. However, the pattern of generic distribution is now reasonably clear. *Liriomyza* and *Cerodontha* s. str. occur from Arica to Tierra del Fuego, while *Melanagromyza* has the largest number of species in central Chile, being poorly represented in the extreme north and totally absent in the south. *Phytomyza* appears to be restricted to the south, from Valdivia to Tierra del Fuego. *Phytoliriomyza* is surprisingly widespread, occurring from Antofagasta at 4000 m to Tierra del Fuego. Many further species certainly await discovery and it will be a rewarding task for the future with further collecting to work out the distribution of known species, and in particular by rearing adults from leafmines and stems, to obtain further information on the hosts of the 73 species now recorded.

## 2. Materials and methods

The present study results primarily from a two months' visit to Chile in January and February, 1978. Collecting was undertaken from the extreme north in desert areas at Arica on the border with Peru to Puerto Montt in south-central Chile. Three days were spent in mountain areas in Tarapacá, Santiago and Cautin, and the northern area of *Nothofagus* forest was investigated between Osorno and Vulcan Antillanca. Some 400 specimens were collected and leafmines were found on 40 different hosts. In addition, 400 specimens collected by L. PEÑA and now in the Canadian National Collection, Ottawa, and a similar number obtained by Dr. E. I. SCHLINGER and colleagues during his Sabbatical in Chile 1966 and now deposited in the California Academy of Sciences, San Francisco have also been studied. This further material includes specimens from high elevations of 4000 m or more and also from the extreme south in Tierra del Fuego.



In the keys provided below essential information on hosts (where known), distribution, illustrations of male genitalia and normally one or two main references are provided (although frequently not that of the original description, which in many cases is of less importance than subsequent revisionary descriptions). The descriptions of new species are dealt with separately in Section 5.

A discussion of the biology, rearing methods and preservation of both adults and leafmines of Agromyzidae was given by SPENCER & STEGMAIER (1973: 7—8 and 15—17). Also a convenient method for preparing and mounting male genitalia was provided by SPENCER (1981: 15—18).

The following abbreviations are used for collections in which holotypes and paratypes are deposited:

- AC — Author's collection (to be deposited in due course in British Museum);  
 BM — British Museum (Natural History), London;  
 CAS — California Academy of Sciences, San Francisco;  
 CNC — Canadian National Collection, Ottawa;  
 UChS — Universidad de Chile, Santiago;  
 UNA — Universidad del Norte, Arica.

### 3. Key to subfamilies and genera of Chilean Agromyzidae

- 1 Subcosta developed throughout its length, coalescing with vein R1 before reaching costa (subfamily **Agromyzinae**) . . . . . 2  
 — Subcosta becoming a fold distally and ending at costa separately and basad of R1 (subfamily **Phytomyzinae**) . . . . . 4  
 2 Pre-scutellars lacking . . . . . 3  
 — Pre-scutellars present . . . . . **Agromyza** Fallén  
 3 Male normally with vibrissal fasciculus (figs. 24, 30), raised keel normally dividing base of antennae; largely black species; male genitalia: aedeagus frequently asymmetrical, basal sclerites extended (fig. 36) . . . . . **Ophiomyia** Braschnikov  
 — Male never with vibrissal fasciculus, base of antennae not divided by prominent raised keel; largely greenish-black species; male genitalia: aedeagus symmetrical, basal sclerites short (figs. 6, 13) . . . . . **Melanagromyza** Hendel  
 4 Orbital setulae erect or reclinate, or absent . . . . . 5  
 — Orbital setulae distinctly proclinate (fig. 96) . . . . . 11  
 5 Halteres at least partially black (in Chile) . . . . . **Amauromyza** Hendel  
 — Halteres pale, yellow or white . . . . . 6  
 6 No pre-sutural dorso-central . . . . . **Calycomyza** Hendel  
 — Pre-sutural dc well developed . . . . . 7  
 7 Third antennal segment with spine or angulate at upper corner (fig. 43), or lunule enlarged, or ocellar triangle extended, at least in outline, to margin of lunule . . . . . **Cerodontha** Rondani  
 — Third antennal segment normally small, round, or more elongate (fig. 96) . . . . . 8  
 8 Stridulating mechanism present in male; frons and scutellum normally yellow (dark in Chile only in *L. patagoniensis* sp. n. and *L. peullae* Mall.) . . . . . **Liriomyza** Mik  
 — Stridulating mechanism in male lacking . . . . . 9  
 9 Scutellum deep black (in Chile) . . . . . **Galiomyza** Spencer  
 — Scutellum grey or yellowish . . . . . 10  
 10 Single ors present . . . . . **Haplopeodes** Steyskal  
 — 2 ors . . . . . **Phytoliriomyza** Hendel (in part)  
 11 Costa extending to vein M 1+2 . . . . . **Phytoliriomyza** Hendel (in part)  
 — Costa ending at vein R 4+5 . . . . . 12  
 12 Male genitalia: distal section of aedeagus simple (not bifid), lying below a lobe with supporting sclerites on dorsal side of aedeagus (fig. 109); pupation in leaf . . . . . **Chromatomyia** Hardy  
 — Male genitalia: distal section of aedeagus bifid, without such lobe above (fig. 111); pupation on ground (in Chile) . . . . . **Phytomyza** Fallén



## 4. Descriptions of genera and keys to species of Chilean Agromyzidae

4.1. Genus *Melanagromyza* Hendel

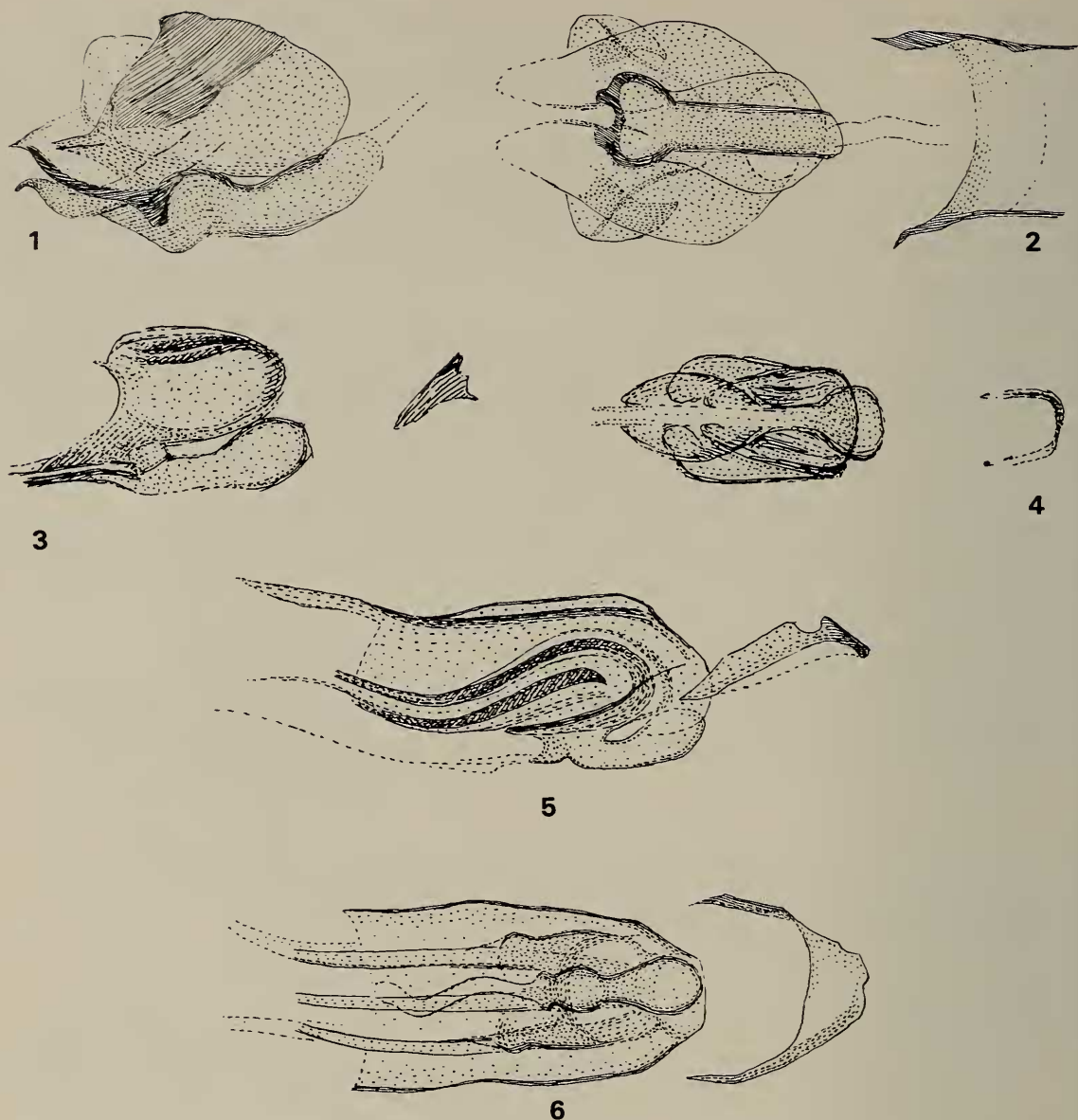
This is the second largest genus in Chile, with 14 species now recorded, of which 6 are new and 4 new to Chile. Females only have been seen of several further species but it is not proposed to describe these in the absence of males. One large greenish species is not uncommon in the Maipú valley, Santiago collected in March, 1966 but all 20 specimens seen were females.

The genus is well represented throughout the Neotropical Region. A key to 50 Neotropical species was given by SPENCER & STEGMAIER (1973: 150) but 12 further species were later recorded in Venezuela (SPENCER, 1973b: 9). The genus is best represented in the tropics — of both the New and Old Worlds — and the number of species diminishes rapidly at higher elevations and high latitudes. In Chile two species are now known in Tarapacá but none in Magallanes.

Differentiation of adults is frequently difficult on external characters but there are invariably small but distinctive differences in the male genitalia. The majority of species feed as internal borers in stems of a wide variety of hosts, with a few feeding in flower-heads (*M. neotropica* in Chile). Of the Chilean species the host is only known of 5 species but collecting puparia from stems of mature plants is not difficult and many new species can be discovered in this way. The posterior spiracles of the larva (and puparium) are frequently diagnostic of the species (cf. fig. 14).

Key to *Melanagromyza* species (including two *Ophiomyia* species)

- |   |  |                          |
|---|--|--------------------------|
| 1 | Squamal fringe pale, white or ochrous . . . . .  | 2                        |
| — | Squamal fringe dark, brown or black . . . . .  | 12                       |
| 2 | 3+1 or 3+0 dc . . . . .  | 3                        |
| — | Only 2 postsutural dc . . . . .  | 4                        |
| 3 | Large species, wing length 2.8—3.1 mm . . . . .  | <b>tetrae</b> (Malloch)  |
|   | Synopsis. Frons strongly projecting above eye; 2 ors, 3 ori; mesonotum bronzy-black, with 3 or 4 dc; male genitalia: aedeagus as in figs. 1, 2 (holotype in BM).<br>Host. Unknown.<br>Distribution. Osorno. Peulla; new record: Curico, 1 ♀, Rio Teno, 2400 m, Baños Azufre road, on Argentina border, 7. III. 62 (L.E.P.).<br>References. MALLOCH (1934: 483); SPENCER (1963: 322).                                     |                          |
| — | Smaller species, wing length 2.0—2.5 mm . . . . .  | <b>angolae</b> (Malloch) |
|   | Synopsis. Frons only slightly projecting; 2 ors, 3 ori; mesonotum greenish-black, with normally 3+0 dc, occasionally 3+1; male genitalia: aedeagus as in figs. 3, 4 (holotype, USNM).<br>Host. Unknown.<br>Distribution. Described from Malleco, Angol; new records: 22 ♂♂, 26 ♀♀ seen from Aconcagua, Santiago, Malleco, Cautin, Valdivia, Aysen, Oct., Nov. and Mar. (all L.E.P.).<br>Reference. MALLOCH (1934: 483).  |                          |
| 4 | Arista conspicuously pubescent, lateral hairs longer than basal arista width . . . . .   | 5                        |
| — | Arista at most slightly pubescent, lateral hairs shorter . . . . .   | 6                        |
| 5 | Small species, wing length 1.9—2.1 mm; eye in male bare . . . . .  | <b>regalis</b> Spencer   |
|   | Synopsis. Frons narrow, equal to width of eye; mesonotum and abdomen variably green or even blue, shining; male genitalia: aedeagus as in figs. 5, 6.<br>Host. Unconfirmed but possibly <i>Ipomoea</i> .<br>Distribution. New to Chile. Tarapacá, Arica, grounds of University Museum, 8 ♂♂, 1 ♀, on <i>Ipomoea</i> , 2 and 3. II. 78 (K.A.S.); Dominica (type locality).<br>Reference. SPENCER & STEGMAIER (1973: 164). |                          |



Figs. 1, 2. *Melanagromyza tetrae*, aedeagus. — 1. side view, — 2. ventral view.  
 Figs. 3, 4. *Melanagromyza angolae*, aedeagus. — 3. side view, — 4. ventral view.  
 Figs. 5, 6. *Melanagromyza regalis*, aedeagus. — 5. side view, — 6. ventral view.

— Larger species, wing length 2.5—2.6 mm; eye in male strongly pilose *tarapacensis* sp. n.  
 Synopsis. See description, p.38; male genitalia: aedeagus as in figs. 7, 8.

Host. Unconfirmed, possibly *Ipomoea*.

Distribution. New to Chile. Tarapacá, Arica.

6 Orbit distinctly widening at midpoint . . . . . *splendida* Frick

Synopsis. Medium-sized greenish species, wing length normally 2.2—2.7 mm; 2 ors, 2 ori, orbital setulae numerous, in several rows; frons not projecting above eye, this conspicuously pilose in male; arista appearing bare; mesonotum moderately shining, greenish-black, 2 dc; abdomen distinctly shining, greenish; male genitalia: aedeagus illustrated by SPENCER (1981: figs. 53, 54), mesophallus short but high, with conspicuous ventral bladder.

Hosts. Primarily Asteraceae (no hosts recorded in Chile), larva feeding in stem; puparium straw-coloured, posterior spiracles widely separated, each with an ellipse of 7—9 bulbs.

Distribution. New to Chile: Santiago, Maipú, 4 ♂♂, 4 ♀♀, March and August, 1966 (M. HICHINS & M. E. IRWIN in CAS and AC); widespread in U.S.A., Jamaica, Hawaii.

Reference. SPENCER (1981: 58).

Note. This species is tentatively identified as *M. splendida* but the aedeagus resembles more closely that of *M. virens* Loew (cf. SPENCER 1963: fig. 113). It is possible that a further species in this complex is involved but further splitting is not justified until reared material becomes available.

- Orbit not so widening . . . . . 7
- 7 Ocellar triangle strongly shining . . . . . *gibsoni* (Malloch)

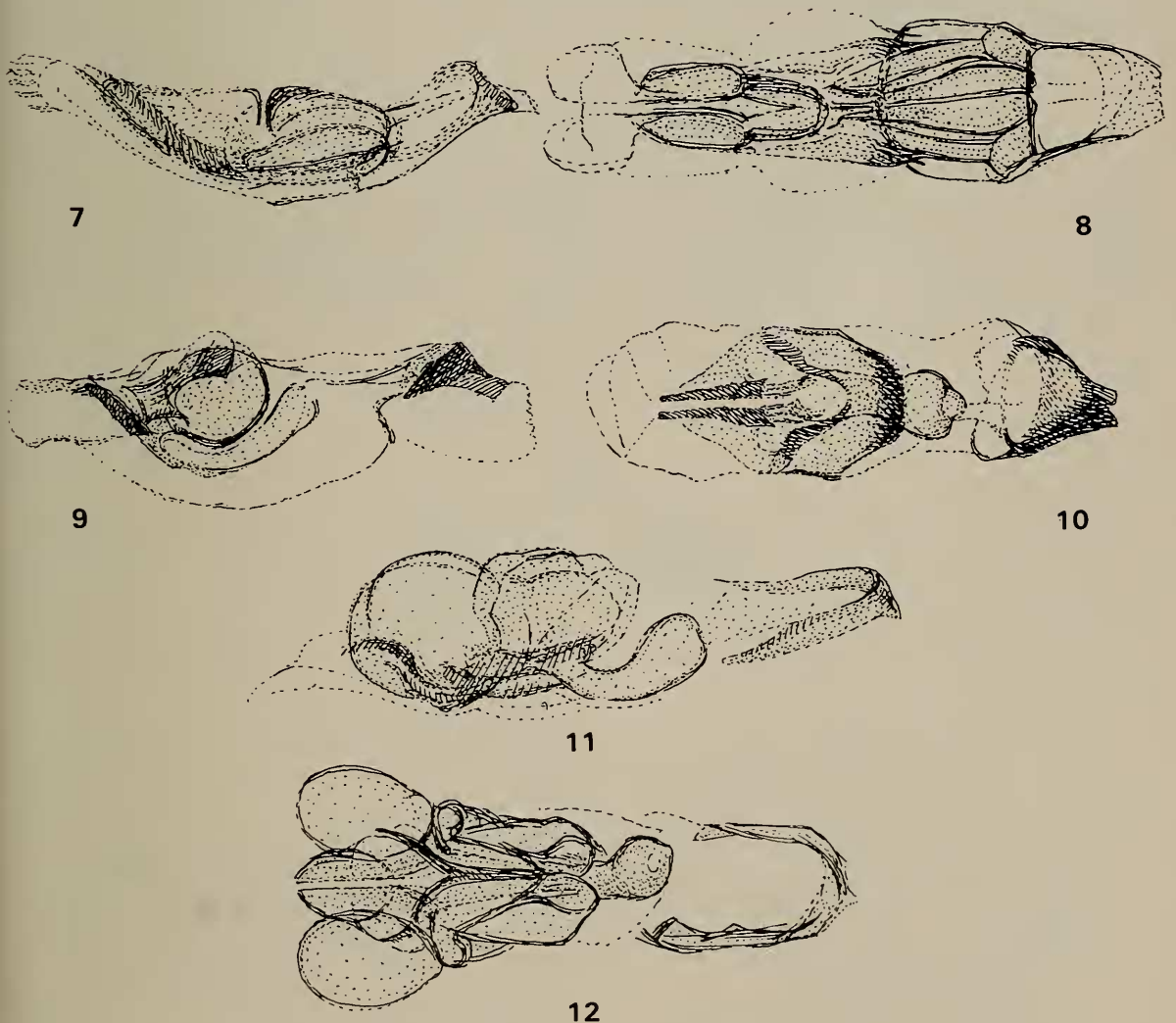
Synopsis. Jowls narrow, 1/6 height of eye, this bare in both sexes: arista bare; mesonotum and abdomen greenish; male genitalia: aedeagus with basal bladder strongly projecting to rear, extending to basal sclerite (cf. SPENCER 1981: figs. 27, 28).

Host. *Medicago sativa* (alfalfa), larva feeding in stem; posterior spiracles each with 4 bulbs.

Distribution. Tarapacá, Poconchile, nr. Arica, 7 ♂♂, 31. I. 78, on *Medicago sativa*; Azapa Valley, 2 ♀♀, 1. II. 78 (all K.A.S.).

Reference. SPENCER (1981: 43).

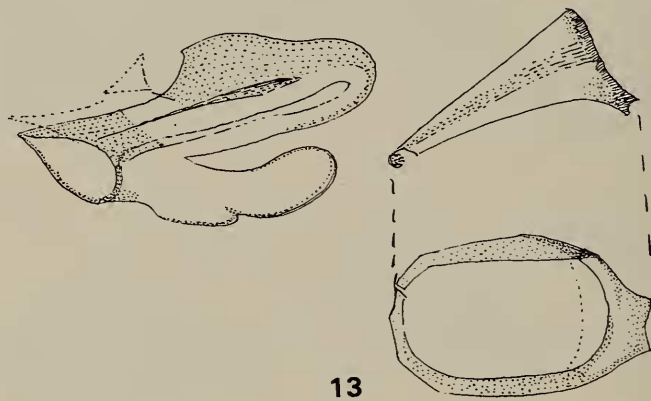
- Ocellar triangle at most moderately shining . . . . . 8



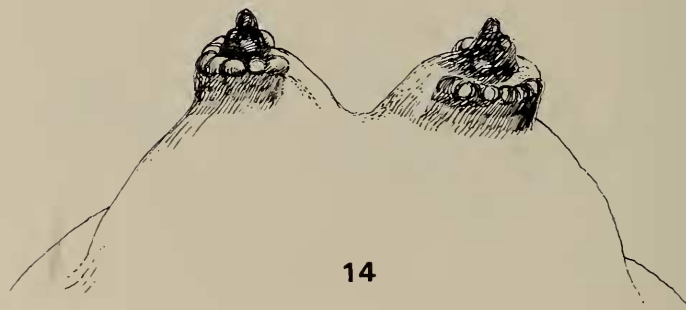
Figs. 7, 8. *Melanagromyza tarapacensis*, aedeagus. — 7. side view, — 8. ventral view.  
 Figs. 9, 10. *Melanagromyza verbenae*, aedeagus. — 9. side view, — 10. ventral view.  
 Figs. 11, 12. *Melanagromyza aguilerai*, aedeagus. — 11. side view, — 12. ventral view.



- 8 Last and penultimate sections of vein M 3+4 equal . . . . . *verbenae* sp. n.  
 Synopsis. See description, p.39; male genitalia: aedeagus as in figs. 9, 10.  
 Host. *Verbena litoralis*, larva internal stem-borer, details unknown.  
 Distribution. Elqui.
- Last section of M 3+4 substantially shorter than penultimate . . . . . 9
- 9 Mesonotum predominantly blackish, only faintly coppery seen from rear  
 . . . . . *aguilerai* sp. n.  
 Synopsis. See description, p.37; male genitalia: aedeagus as in figs. 11, 12.  
 Host. Unknown.  
 Distribution. Limarí.
- Mesonotum more distinctly greenish, rarely blue . . . . . 10
- 10 Frons distinctly projecting above eye . . . . . *chenopodii* Spencer  
 Synopsis. Frons mat black, ocellar triangle and orbits weakly shining; orbital  
 bristles strong, 2 ors, 2 ori; jowls about 1/4 height of eye; arista slightly pubescent;  
 mesonotum shining green, with 2 dc; wing length 2.7—2.9 mm; male genitalia:  
 aedeagus as in fig. 13.  
 Host. *Chenopodium ambrosioides* L., larva feeding in stem; puparium orange-  
 yellow, posterior spiracular processes separated by own diameter, each with an  
 ellipse of 12 bulbs around a stout, short central horn (fig. 14).  
 Distribution. Santiago.  
 Reference. SPENCER, 1963: 309.
- Frons not projecting above eye . . . . . 11



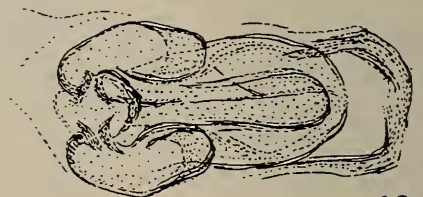
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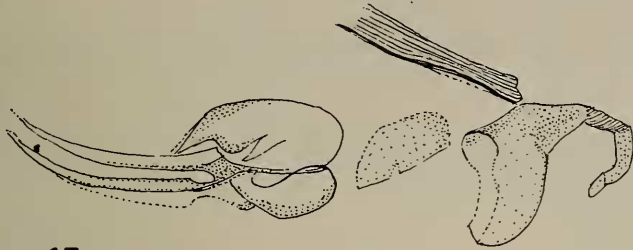


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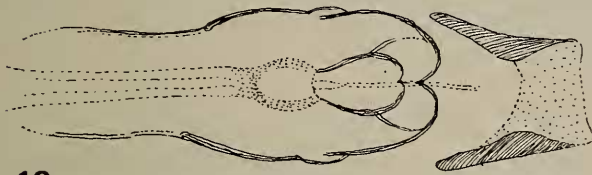
Figs. 13, 14. *Melanagromyza chenopodii*. — 13. aedeagus, side view, — 14. posterior spiracles of puparium.

Figs. 15, 16. *Melanagromyza vicunensis*, aedeagus. — 15. side view, — 16. ventral view.

- 11 Frons broad, about twice width of eye . . . . . *vicunensis* sp. n.  
 Synopsis. See description, p. 39; male genitalia: aedeagus as in figs. 15, 16.  
 Host. Unknown.  
 Distribution. Elqui.



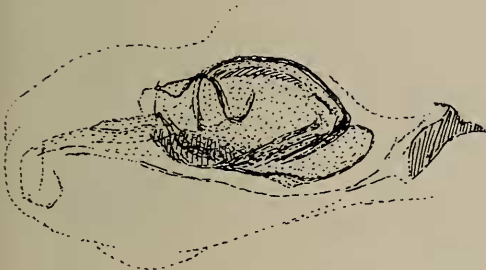
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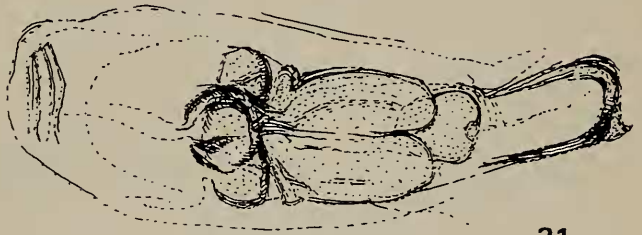
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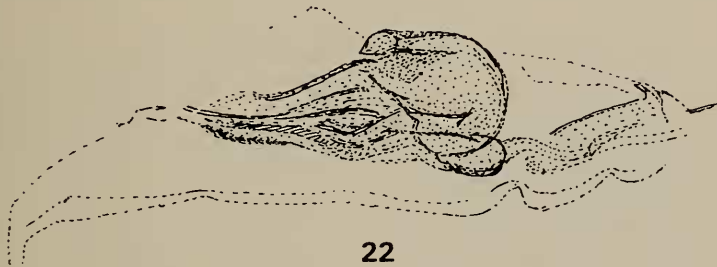
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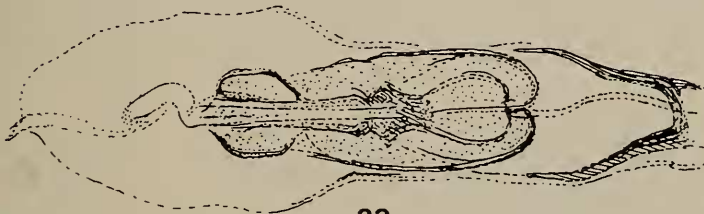
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23

Figs. 17—19. *Melanagromyza neotropica*. — 17. aedeagus, side view, — 18. same, ventral view, — 19. sperm pump.  
 Figs. 20, 21. *Melanagromyza limariensis*, aedeagus. — 20. side view, — 21. ventral view.  
 Figs. 22, 23. *Melanagromyza vasquezi*, aedeagus. — 22. side view, — 23. ventral view.

- Frons narrower, little wider than eye . . . . . **neotropica** Spencer  
 Synopsis. Frons and orbits weakly shining; eye distinctly pilose in male; jowls 1/5—1/6 height of eye; third antennal segment small, round, arista appearing virtually bare; mesonotum shining green, abdomen greenish-coppery; wing length 2.2—2.9 mm; male genitalia: aedeagus as in figs. 17, 18; sperm pump as in fig. 19, blade broad, pale with strong ventral vein.  
 Host. *Bidens*, larva feeding in flower-heads; puparium pale, straw-coloured, posterior spiracles widely separated, each with an ellipse of about 12 bulbs around the central horn.  
 Distribution. New to Chile, Tarapacá, Arica, 1 ♂, 1 ♀, ex flower-heads of *Bidens*, 9. II. 78 (K.A.S.); Argentina (new record), Brazil, Venezuela, Costa Rica.  
 References. SPENCER (1963: 319, 1973b: 22).
- 12 Mesonotum and abdomen shining black . . . . . **praeclara** Spencer  
 Synopsis. Large species, wing length 3.0—3.8 mm; squamae grey, margin and fringe black; male genitalia; aedeagus illustrated by SPENCER (1963: figs. 37a, b).  
 Host. Unknown.  
 Distribution. Llanquihue, Valparaiso; new records: Elqui: Guayacan, 2 ♂♂, 30. X. 76 (Malaise trap); Santiago: Rincoñada Maipú, 1 ♀, 25. III. 66 (Malaise), N. HICHINS & M. E. IRWIN (CNC).  
 Reference. SPENCER (1963: 321).
- Mesonotum black or blackish-green . . . . . 13
- 13 Mesonotum and abdomen entirely black . . . . . **Ophiomyia aricensis** sp. n.
- Mesonotum and abdomen predominantly black but with faint greenish or coppery reflections . . . . . 14
- 14 Narrow keel separating bases of antennae . . . . . **Ophiomyia** sp. (see p. 1).
- No obvious keel separating bases of antennae . . . . . 15
- 15 Small species, wing length in male 2 mm . . . . . **limariensis** sp. n.  
 Synopsis. See description, p.38; male genitalia: aedeagus as in figs. 20, 21.  
 Host. Unknown.  
 Distribution. Limarí: Recoleta.
- Larger species, wing length in male 2.25 mm . . . . . **vasquezi** sp. n.  
 Synopsis. See description, p.38; male genitalia: aedeagus as in figs. 22, 23.  
 Host. Unknown.  
 Distribution. Elqui: Vicuña; Limarí, Fray Jorge National Park.

#### 4.2. Genus *Ophiomyia* Braschnikov

Five species are recorded below, of which four are described as new and one is tentatively identified as a stem-miner on *Abutilon* and *Sida* known from the United States and being described by SPENCER in SPENCER & STEYSKAL (in press).

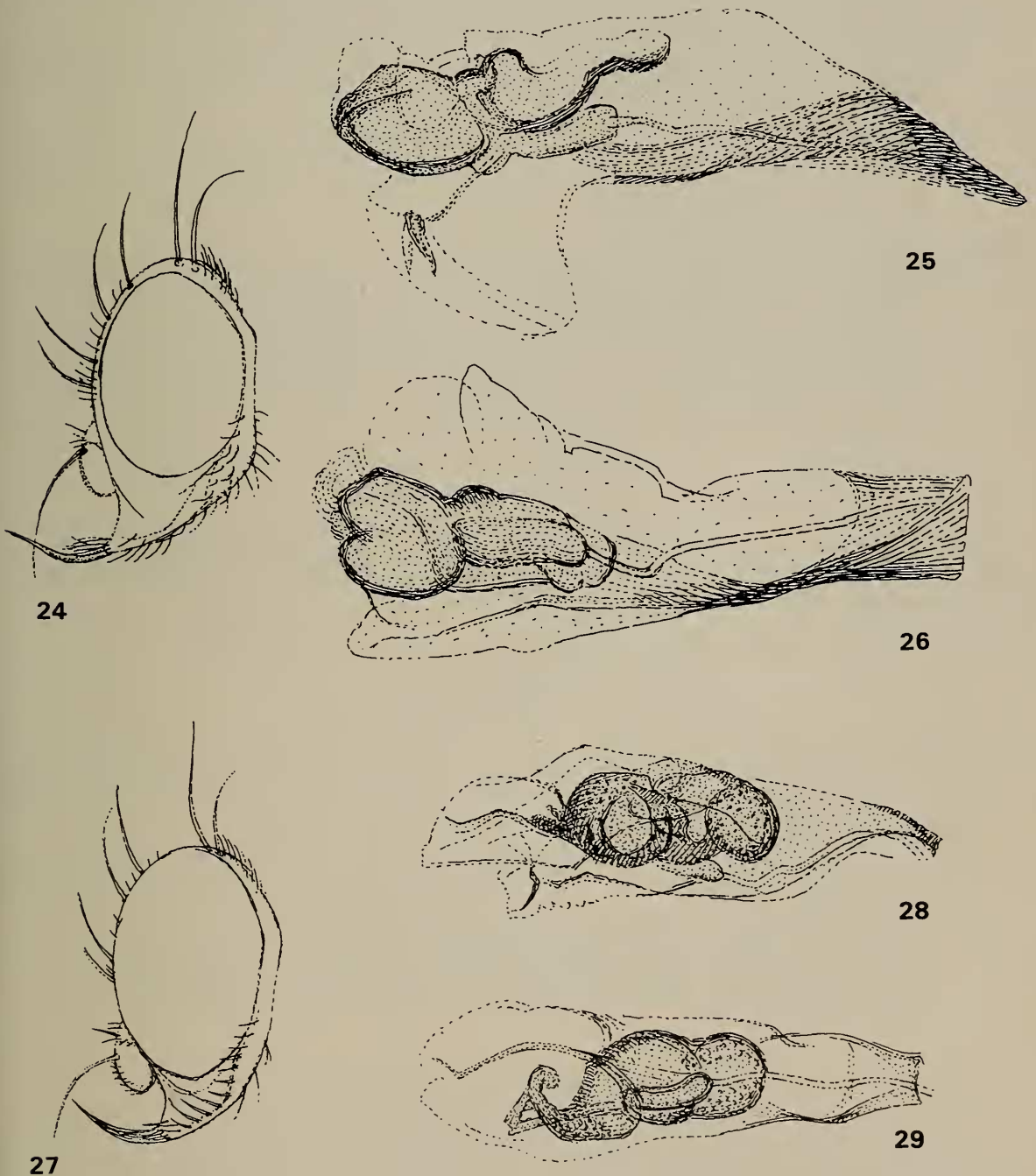
Of the new species, three are typical of the genus with a vibrissal fasciculus in the male and a prominent facial keel dividing the antennae. One lacks these characters and externally resembles a *Melanagromyza* but is placed in *Ophiomyia* on the basis of the male genitalia; this also applies to the undescribed species, in which the biology and larval characters also associate the species with *Ophiomyia* rather than *Melana-gromyza*.

#### Key to *Ophiomyia* species

- 1 Male with vibrissal fasciculus (figs. 24, 30); raised facial keel present in both sexes . . . . . 2
- Male with normal, simple vibrissa (fig. 33); no distinct facial keel present . . . . . 4
- 2 Large species, wing length 2.5 mm; jowls broad, 1/2 height of eye (fig. 24) . . . . . **mallecensis** sp. n.  
 Synopsis. See description, p.40; male genitalia: aedeagus as in figs. 25, 26.  
 Host. Unknown.  
 Distribution. Malleco.



- Smaller species, wing length less than 2 mm; jowls narrower, at most 1/4 height of eye . . . . . 3
- 3 Vibrissal corner forming angle of approximately 45° (fig. 27) . . . . . *aricella* sp. n.  
 Synopsis. See description, p.40; male genitalia: aedeagus as in figs. 28, 29.  
 Host. Possibly *Bidens*, with larva feeding as stem-miner.  
 Distribution. Tarapacá.
- Vibrissal corner less acute, forming angle of approximately 80° (fig. 30) *vulgaris* sp. n.  
 Synopsis. See description, p.41; male genitalia: aedeagus as in figs. 31, 32.  
 Host. Unknown.  
 Distribution. Elqui, Santiago.



Figs. 24—26. *Ophiomyia mallecensis*. — 24. head, — 25. aedeagus, side view, — 26. same, ventral view.  
 Figs. 27—29. *Ophiomyia aricella*. — 27. head, — 28. aedeagus, side view, — 29. same, ventral view.

- 4 Large species, wing length in both sexes 2.5 mm; ocellar triangle entirely mat  
 . . . . . *aricensis* sp. n.  
 Synopsis. See description, p.40; male without vibrissal fasciculus (fig. 33); male genitalia: aedeagus as in figs. 34, 35.  
 Host. Unknown.  
 Distribution. Tarapacá.
- Smaller species, wing length in male at most 2 mm; ocellar triangle strongly shining  
 . . . . . *Ophiomyia* sp. (see Note)  
 Synopsis. Small species, wing length from 2.0 mm in male to 2.3 mm in female; frons little wider than eye, not projecting above eye; facial keel, if detectable, narrow; mesonotum with 2 dc; mesonotum predominantly shining black, but sometimes with faint greenish reflections, abdomen similar; squamae grey, margin and fringe black; male genitalia: aedeagus as in fig. 36.  
 Host. None known in Chile, in U.S.A. *Abutilon theophrasti*, *Sida cordifolia*, larva forming external stem-mine, which can appear raised, as a "welt", pupating in stem; puparium pale, with posterior spiracles each with 4—6 bulbs.  
 Distribution. New to Chile: Santiago, Maipú, 2 ♂♂, 6 ♀♀, March and August, 1966 (N. HICHINS and M. E. IRWIN), in CAS and AC: U.S.A., widespread in east from Wisconsin to Florida.  
 Reference. SPENCER & STEYSKAL (in press).  
 Note. In the type series from the United States both mesonotum and abdomen appear entirely black. However, in the present series there is normally at least a trace of greenish colour. The male genitalia (fig. 36) and SPENCER & STEYSKAL (in press: figs. 197, 198) appear identical in the two populations. The normal host in U.S.A., *Abutilon theophrasti*, is not known to occur in Chile and presumably the species feeds on other genera of Malvaceae.

#### 4.3. Genus *Agromyza* Fallén

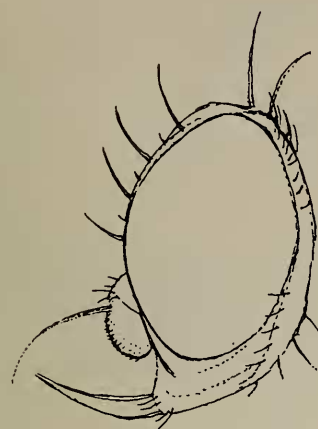
Only a single introduced species is known in this genus. Although *Agromyza* is represented by several grass-feeding species in Brazil, it is interesting that the genus appears to be lacking naturally in Chile.

##### Key to *Agromyza* species

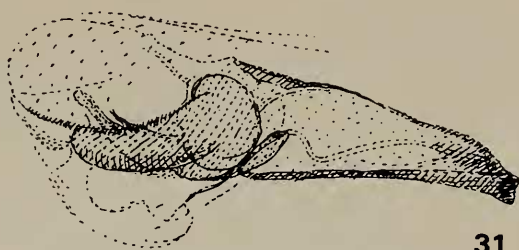
- Exceptionally large species, wing length up to 4.2 mm . . . . . *apfelbecki* Strobl  
 Synopsis. Frons broad,  $2\frac{1}{2}$ —3 times width of eye, strongly projecting above eye in profile, frons and antennae reddish; mesonotum mat, ash-grey, with 4+2 dc; wing length from 3.4 mm in male to 4.2 mm in female.  
 Host. *Cynara scolymus* L. (alcachofa), larva forming broad mine along the midrib, with short offshoots into the leaf-blade; puparium reddish-brown, pupating externally.  
 Distribution. Elqui, Quillota, probably present in other provinces where artichoke is cultivated; widespread in Mediterranean area of Europe.  
 References. SPENCER [1963: 295, 1973a: 148 (economic importance)].

#### 4.4. Genus *Amauromyza* Hendel

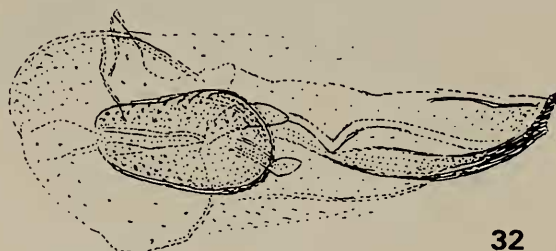
Two species are recorded below, one of which is new to Chile. *A. maculosa* is common as a leaf-miner on Asteraceae in central Chile and occurs widely from Argentina and Brazil to the United States; *A. fuscibasis* is an exclusively Neotropical species.



30



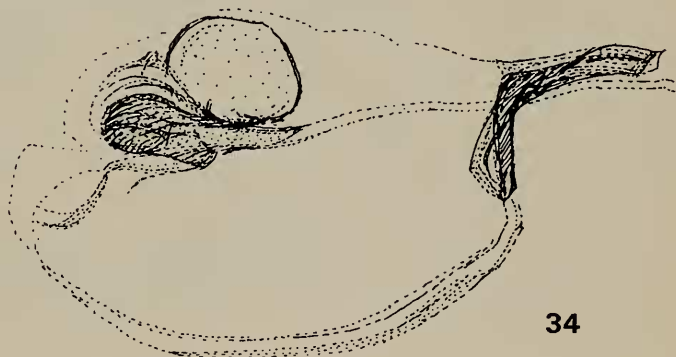
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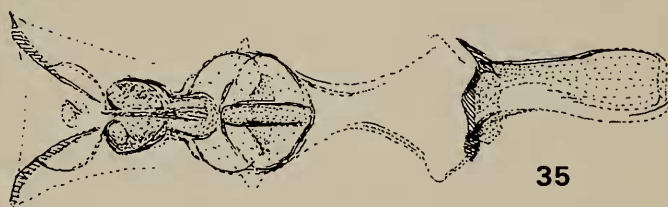
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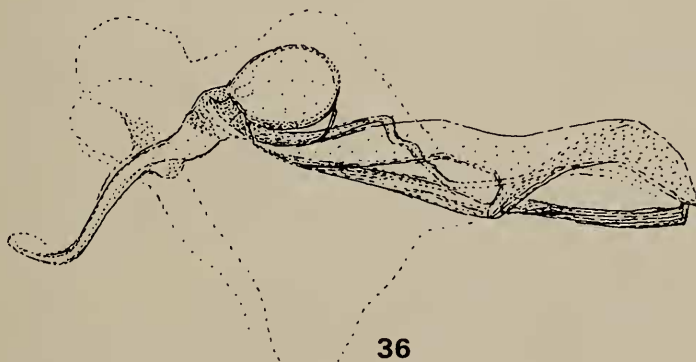
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36

Figs. 30—32. *Ophiomyia vulgaris*. — 30. head, — 31. aedeagus, side view, — 32. same, ventral view.

Figs. 33—35. *Ophiomyia aricensis*. — 33. head, — 34. aedeagus, side view, — 35. same, dorsal view.

Fig. 36. *Ophiomyia* sp. (*Abutilon*), aedeagus.



Key to *Amauromyza* species

- 1 Squamal fringe yellowish; halteres variegated, black below, white above on inside . . . . . **maculosa** (Malloch)  
 Synopsis. Shining black species; frons narrow, with strong orbital bristles and 3+1 strong dc; wing length from 2.1 mm in male to 2.5 mm in female; male genitalia: aedeagus ending in short, diverging tubules (cf. SPENCER 1973b: figs. 202, 203); sperm pump with bowl-shaped base.  
 Hosts. Asteraceae, occurring on many genera, in Chile found on *Bidens*, *Chrysanthemum*, *Conyza*, *Solidago*, *Sonchus* and *Taraxacum*; larvae form a large blotch mine, several frequently feeding together; puparium reddish-brown, pupation taking place on ground.  
 Distribution. New to Chile, widespread from Tarapacá to Valdivia; Argentina, Brazil, Venezuela; U.S.A.  
 References. SPENCER (1963: 336; 1973a: 151; 1973b: 72).  
 Note. SHEWELL (1967) recorded *A. maculosa* from Easter Island and also from Magallanes. However, the data given for the single female referred to Magallanes are identical to those of the series of the dark *Liriomyza* described below on p. 47 as *patagoniensis* sp. n. It now seems clear that SHEWELL's record is inaccurate and the most southerly known occurrence of *A. maculosa* is Valdivia.
- Squamal fringe black; halteres uniformly dark . . . . . **fuscibasis** (Malloch)  
 Synopsis. Generally resembling *A. maculosa* but orbital bristles even stronger, and generally slightly larger; male genitalia: aedeagus with longer, more slender distal tubules (cf. SPENCER 1973b: figs. 200, 201).  
 Hosts. None recorded in Chile, certainly Asteraceae, with possible genera being *Baccharis* and *Solidago*.  
 Distribution. Central Chile, specimens seen from Elqui, Quillota, Santiago (Maipú); Argentina, Venezuela.  
 References. SPENCER (1963: 336; 1973b: 71).

4.5. Genus *Cerodontha* Rondani

This genus is poorly represented in Chile, with 7 species now recorded. Three of the nine subgenera are present, with four new species, three in *Cerodontha*, one in *Butomomyza*. Fifteen species have hitherto been known in the Neotropical region (SPENCER 1973b; SPENCER & STEGMAIER 1973) but 21 species were recently confirmed in California (SPENCER 1981) and 43 in the United States (SPENCER & SKEYSKAL in press).

*Cerodonta* [sic] *nigricornis* Becker 1919 was described from a single female from Casitagua, Ecuador (in the Muséum d'Histoire Naturelle, Paris) at an altitude of 3512 m. It generally resembles *C. magellani* sp. n. described below but its status can only be further clarified when a male from the type area becomes available.

Key to *Cerodontha* species

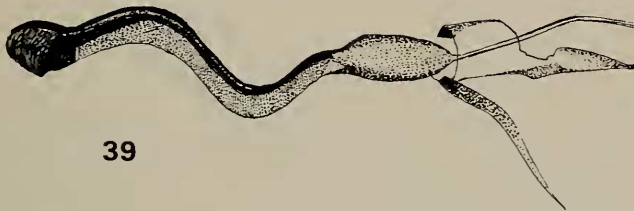
- 1 Scutellum with only 1 pair of scutellar bristles (subgenus *Cerodontha*) . . . . . 2  
 — Scutellum with 2 pairs of scutellar bristles . . . . . 6  
 2 Mesonotum entirely black to margin of scutellum . . . . . 3  
 — Mesonotum yellow centrally adjoining scutellum . . . . . **dorsalis** (Loew)  
 Synopsis. Third antennal segment with spine at upper corner; mesonotum mat grey; femora yellow; wing length 2.4–2.7 mm; male genitalia: aedeagus with distiphallus entirely divided, with enlarged, elongate processes at end (figs. 37, 38).  
 Hosts. Numerous grasses, larva feeding mainly in leaf-sheath, where pupation takes place; no hosts recorded in Chile.  
 Distribution. New to Chile: Tarapacá, Pica, 1 ♂, 21. VIII. 66 (E. I. SCHLINGER, M. E. IRWIN); 1 ♀, 23. IX.—20. XI. 66 (M. E. IRWIN, E. MEDINA); Bolivia, Brazil; widespread in United States.



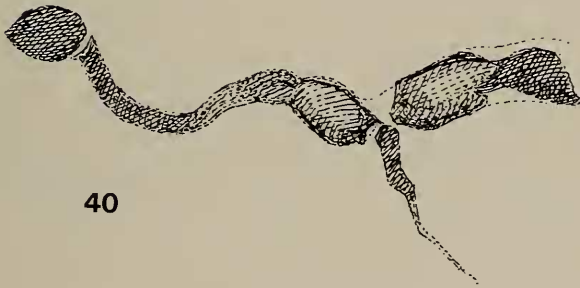
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Figs. 37, 38. *Cerodontha (Cer.) dorsalis*, aedeagus. — 37. side view, — 38. ventral view.  
 Fig. 39. *Cerodontha (Cer.) flavifrons*, aedeagus.  
 Fig. 40. *Cerodontha (Cer.) patagonica*, aedeagus.

3	2 ors	.....	4
—	1 ors	.....	5
4	Femora entirely bright yellow	.....	<i>flavifrons</i> (Philippi)

Synopsis. Frons, jowls, face and palps bright yellow; third antennal segment black, with short spine at upper corner; mesonotum uniformly grey, acr in 2 rows; rear of humerus, notopleural triangle and upper margin of mesopleura bright yellow, side of thorax otherwise dark; wing length 2.4—2.7 mm; male genitalia: aedeagus as in fig. 39.

Hosts. Poaceae, species noted in Chile *Arrhenaterum elatius* (Valdivia), *Holcus lanatus* (Cautin and Valdivia) and *Polypogon montspeliensis* (Elqui), all K.A.S.; larva forms irregular linear mine, pupating internally.

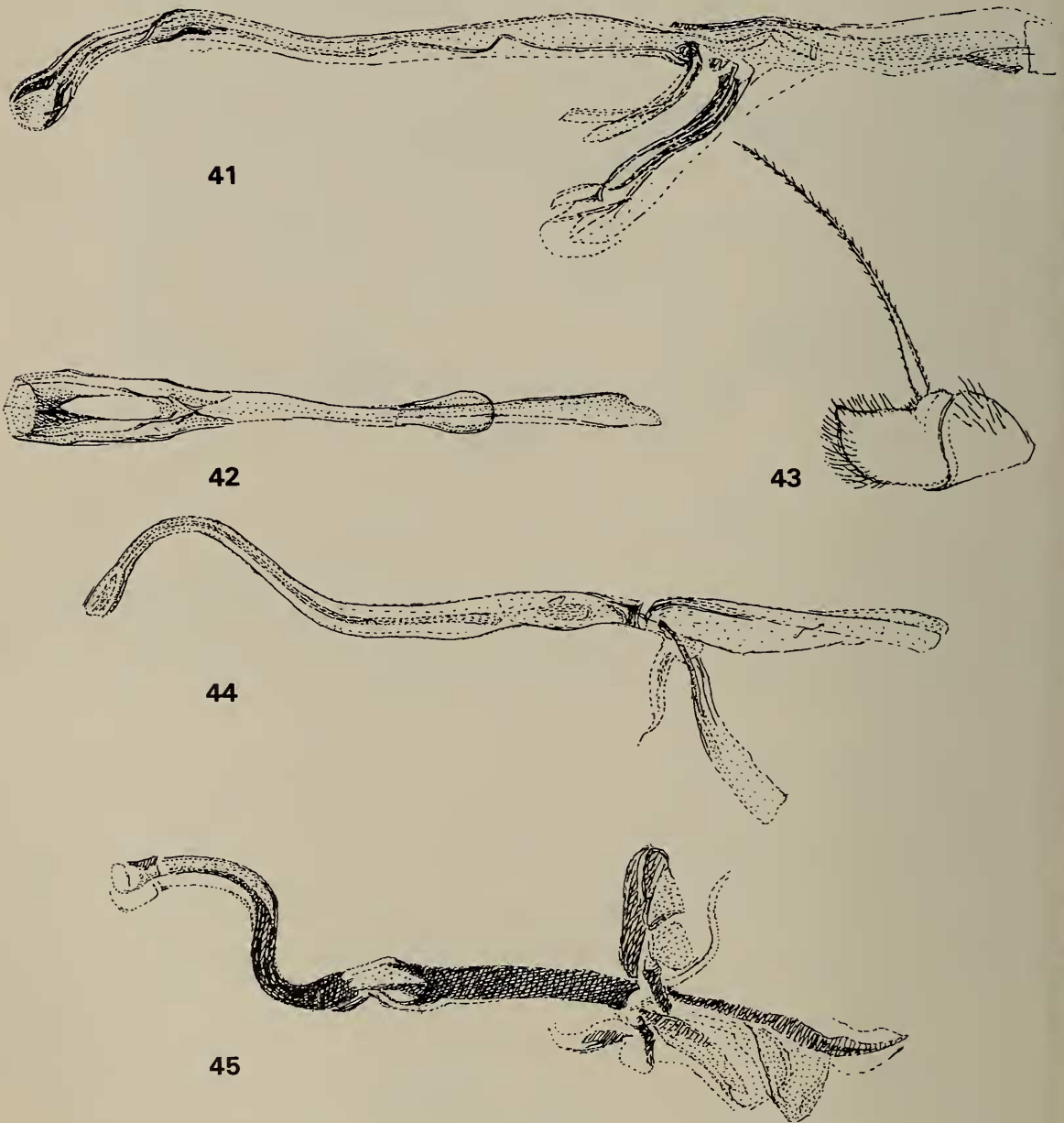
Distribution. Common and widespread from Elqui to Magallanes (including Tierra del Fuego); Juan Fernandez Is.

References. PHILIPPI (1865: 777); SPENCER (1963: 332; 1964: 252).

—	Femora yellow at knees for femoral width	.....	<i>patagonica</i> sp. n.
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Synopsis. See description, p.42; male genitalia: aedeagus as in fig. 40.  
 Host. Unknown, certainly Poaceae.  
 Distribution. Magallanes, including Tierra del Fuego.

- 5 Femora yellow at knees for twice femoral width; mesopleura broadly yellow on upper third . . . . . **chilensis sp. n.**  
 Synopsis. See description, p.41; male genitalia: aedeagus (figs. 41, 42) exceptionally long.  
 Host. Unknown, certainly Poaceae.  
 Distribution. Santiago.
- Femora yellow at knees for not more than femoral width; mesopleura only narrowly yellow along upper margin . . . . . **magellani sp. n.**  
 Synopsis. See description, p.42; third antennal segment angulate and pilose (fig. 43) male genitalia: aedeagus (fig. 44) long, pale, fused at apex.  
 Host. Unknown, certainly Poaceae.  
 Distribution. Magallanes, including Tierra del Fuego.



Figs. 41, 42. *Cerodontha (Cer.) chilensis*. — 41. aedeagus, side view, — 42. distiphallus ventral view.  
 Figs. 43, 44. *Cerodontha (Cer.) magellani*. — 43. third antennal segment, — 44. aedeagus, side view.  
 Fig. 45. *Cerodontha (But.) chilena*, aedeagus, side view.



- 6 Lunule yellow (in Chile); ocellar triangle extended, at least in outline almost to margin of lunule (subgenus *Icteromyza*) . . . . . **longipennis** (Loew)  
 Synopsis. Frons largely yellow, upper orbits blackish; third antennal segment round, varying from yellowish-brown to black; mesonotum mat grey; femora blackish-grey but yellow on apical third on fore-legs, for slightly more than femoral width on mid- and hind-legs; wing length at most 2.5 mm; male genitalia: aedeagus long, distal tubules fully divided, recurved (cf. SPENCER 1969: fig. 237).  
 Host. *Juncus* spp., larva feeding in stem.  
 Distribution. Malleco, Angol; widespread in U.S.A. and Canada.  
 References. MALLOCH (1934: 478); SPENCER (1969: 140).
- Lunule dark, black or grey; ocellar triangle not extended (subgenus *Butomyza*)  
 . . . . . **chilenica** sp. n.  
 Synopsis. See description, p.43; male genitalia: aedeagus with characteristic curvature (fig. 45), distal tubules not diverging.  
 Host. Unknown, probably *Carex*.  
 Distribution. Magallanes.

#### 4.6. Genus *Liriomyza* Mik

This is the largest genus in Chile, with 23 species now recorded, of which 12 are new and 2 new to Chile. Although *Liriomyza* is a predominantly temperate, northern hemisphere genus it is also well represented in South America with about 40 species known from Venezuela to Argentina. Following recent studies 78 species have now been recorded in U.S.A.

The genus is widely distributed in Chile, from Tarapacá to Magallanes and occurs up to altitude of 4000 m in the Andes.

Several species in the genus *Phytoliriomyza* closely resemble *Liriomyza* on external characters and even the male genitalia may not indicate the correct generic affiliation in some cases. The only consistent character for separating the two genera is the presence in males of *Liriomyza* of a process considered to be a stridulating mechanism, consisting of a "scraper" — a sharp strongly sclerotized ridge — on the hind-femora and a "file" along the connecting membrane below the abdominal tergites, consisting of a line of chitinized scales (cf. SPENCER 1973b: Plates 1 and 2). Species in the small genus *Haplopeodes* may also be mistaken for *Liriomyza* and therefore three *Phytoliriomyza* and one *Haplopeodes* sp. are included in the key provided below.

Two species, *peullae* Malloch and *cruciata* Blanchard are now transferred to *Liriomyza* below. *Liriomyza patagonica* (Malloch) was recorded in error as present in Chile by SPENCER (1963) but is in fact only known in Argentina. *Liriomyza gayi* (PORTER, 1915) cannot be identified from the brief description and there is no trace of the type specimens in the Museo Nacional de Historia Natural, Santiago, and it must be treated as a nomen dubium.

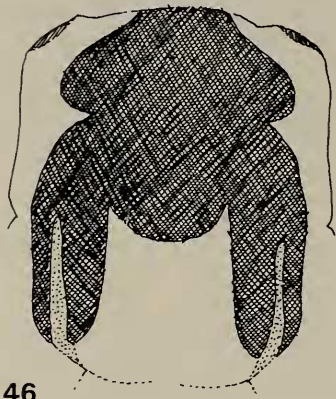
Of the 23 known species the host is known of only 8. The host of *L. andina* was discovered to be *Plantago* spp.

#### Key to *Liriomyza* species (including 1 *Haplopeodes* sp. and 3 *Phytoliriomyza* spp.)

- 1 Mesonotum partially yellow before margin of scutellum . . . . . 2  
 — Mesonotum uniformly dark, black or grey, to margin of scutellum . . . . . 6  
 2 Mesonotum with shining black bands (rarely more brownish), broadly yellow adjoining scutellum (fig. 46) . . . . . **marginalis** (Malloch)  
 Synopsis. Head entirely yellow, including hind-margin of eye; mesonotum with 2+1 or 3+1 dc; legs: coxae and femora bright yellow, tibiae and tarsi somewhat

darker, brownish; wing length 1.8—2.0 mm, last section of vein M 3+4 variable, normally about  $1\frac{1}{2}$  times length of penultimate; male genitalia: aedeagus illustrated by SPENCER (1973b: figs. 157, 158); hind-corner of epandrium with characteristic sclerotized bar.

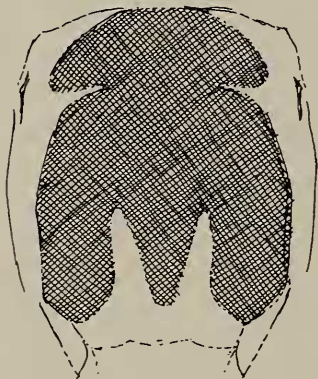
Hosts. None known in Chile but larva feeds exclusively on Poaceae, genera recorded include *Digitaria*, *Panicum*, *Paspalum* and *Zea mays*; larva forms narrow linear mine, pupating in leaf with anterior spiracles long, divided (fig. 47), projecting through epidermis.



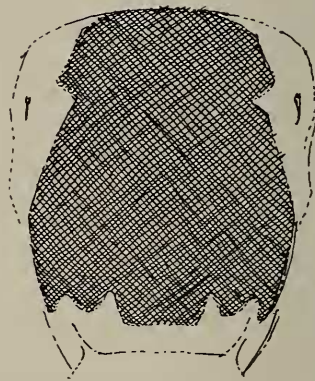
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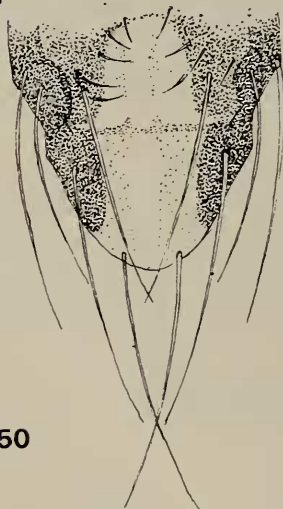
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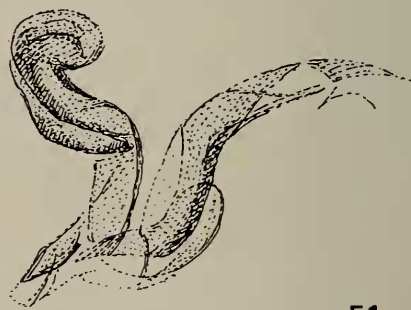
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- Figs. 46, 47. *Liriomyza marginalis*. — 46. mesonotum, — 47. anterior spiracles of puparium.
- Fig. 48. *Liriomyza andina*, mesonotum.
- Fig. 49. *Liriomyza subinsignis*, mesonotum.
- Fig. 50. *Liriomyza quadrata*, mesonotum.
- Fig. 51. *Liriomyza lolii*, aedeagus, side view.

Distribution. New to Chile. Tarapacá, Arica, mouth of Lluta River, 1 ♂, 10. I. 66 (M. E. IRWIN); Santiago, Rincoñada Maipú, 1 ♀, 24. III. 66 (N. HICHINS & M. E. IRWIN); Quebrada de la Plata, Maipú, 1 ♀, 12. II. 66 (M. E. IRWIN); Brazil, Peru, Venezuela, Caribbean area, southern U.S.A.

References. SPENCER & STEGMAIER (1973: 102); SPENCER (1973b: 58).

- Mesonotum without such bands . . . . . 3
- 3 Mesonotum with two yellow triangles adjoining scutellum (fig. 48) *andina* (Malloch)  
 Synopsis. Frons yellow, third antennal segment darkened, brownish; mesonotum shining black; mesopleura yellow above, with black patch below; femora variably darkened, mottled or more yellow apically; wing length 2.1—2.3 mm.  
 Host. First record — *Plantago* spp., incl. *P. fumicla* and *P. major*, larva forming irregular linear mine, frequently towards base of leaf, pupating in leaf, with anterior spiracles projecting through epidermis.  
 Distribution. Los Andes, Los Andes; new records: Elqui, Lagunillas, 16 km S. of Coquimbo, 2 ♂♂, 4 ♀♀, 17. I. 78, also mines abundant on *Plantago fumicla*; La Serena, 1 ♀, 23. I. 78; Vicuña, 1 ♂, 17. I. 78; River Elqui, 20 km E. of La Serena, 1 ♂, 1 ♀, 17. I. 78 (all K.A.S.); Tarapacá, Arica, 1 ♀, emerged 8. II. 78 ex puparium in *P. major* coll. 28. I. 66 (K.A.S.).  
 References. MALLOCH (1934: 471); SHEWELL (1967: 332) (Easter Island).  
 Note. The male genitalia and form of puparium indicate close relationship with *L. marginalis* and also with *L. blechi* (cf. SPENCER & STEGMAIER 1973). *Plantago* has been recorded as a host of a species in this group in Florida (loc. cit.).
- Mesonotum without such triangles . . . . . 4
- 4 Mesonotum yellow centrally adjoining scutellum (fig. 50), ovipositor sheath normal 5
- Mesonotum with black band centrally almost to margin of scutellum, broadly yellow laterally (fig. 49); ovipositor sheath in female elongate . . . . *subinsignis* sp. n.  
 Synopsis. See description, p. 47; male genitalia unknown.  
 Host. Unknown.  
 Distribution. Tarapacá, Arica.
- 5 Mesonotum shining black; large species, wing length 2.3—3.2 mm *quadrata* (Malloch)  
 Synopsis. Head yellow, including all antennal segments; mesonotum with U-shaped area adjoining scutellum yellow (fig. 50); mesopleura bright yellow with normally only small dark area on lower margin; legs with femora bright yellow; male genitalia: aedeagus illustrated by SPENCER (1973b: figs. 164, 165).  
 Hosts. Solanaceae, including *Solanum lycopersicum*, *S. nigrum*, *S. tuberosum*, larva forming large, irregular, linear-blotch mine.  
 Distribution. Widespread and common from Tarapacá to Osorno; Argentina (as *L. subandina* Blanchard); Colombia, Venezuela.  
 References. SPENCER (1963: 365; 1973b: 59).
- Mesonotum grey; smaller species, wing length 2 mm . . . [patagonica (Malloch)]  
 References. MALLOCH (1934: 472); SPENCER (1963: 362).  
 Note. This species is not known to occur in Chile and was recorded in error by SPENCER (1963). All localities given by MALLOCH (1934) are in Argentina near the border with Chile in Llanquihue.
- 6 Scutellum entirely black . . . . . 7
- Scutellum at least yellow centrally . . . . . 10
- 7 Frons yellow . . . . . 8
- Frons predominantly dark, at most ochrous above . . . . . 9
- 8 Squamal fringe dark . . . . . *Phytoliriomyza nigrescens* sp. n.  
 (Scutellum more normally at least partially pale centrally)
- Frons bright yellow . . . . . *lolii* sp. n.  
 (Scutellum rarely faintly yellowish from rear, cf. couplet 12)  
 Synopsis. See description, p. 46; male genitalia: aedeagus as in fig. 51.  
 Host. Poaceae, *Lolium perenne*, certainly other genera, larva forming narrow linear mine.  
 Distribution. Osorno; probably widespread from Limarí to Valdivia.



- 9 All knees distinctly yellow . . . . . **peullae** (Malloch), new combination  
 Synopsis. Frons ochrous, orbits generally black; mesonotum black, moderately shining; notopleura yellow, mesopleura largely black; wing base dark, squamae grey, fringe black; legs black, but knees distinctly yellow; wing length 1.7–2.0 mm; male genitalia: aedeagus as in fig. 52.  
 Host. Poaceae, but no specimens reared.  
 Distribution. Llanquihue, Juan Fernandez Is.; new records: Aconcagua, Piscicultura, 11. XI. 63, 32 specimens (L. PEÑA); Concepcion, Salto del Laja, 3 ♂♂, 9 ♀♀, 11. VIII. 66 (E. I. SCHLINGER, M. E. IRWIN); Magallanes, 4 km W. of Laguna Amarga, 51°00'W, 72°48' S, 300 m, 6 ♂♂, 9 ♀♀, 7. XII. 62 (E. I. SCHLINGER, M. E. IRWIN); Santiago: Los Maitenes, 1400 m, 6 ♂♂, 3 ♀♀, 18. IX. 54 (L. PEÑA); Rincoñada Maipú, 1 ♂, 31. V. 66 (N. HICHINS, M. E. IRWIN); 15 km N. of Casablanca, 1 ♀, 14. X. 66 (E. I. SCHLINGER, M. E. IRWIN); Argentina, Rio Negro, 3.7 km S. of Puerto Moreno, 800 m, 1 ♂, 17. XI. 66 (E. I. SCHLINGER, M. E. IRWIN).  
 References. MALLOCH (1934: 476); SPENCER [1963: 337; 1964: 251 (both as *Phytobia* subg. *Praspedomyza*)].  
 Note. *Praspedomyza* was synonymised with *Liriomyza* by SPENCER (1981: 289) and *peullae* is now accepted as a true grass-feeding *Liriomyza*.
- Only fore-knee indistinctly yellowish . . . . . **patagoniensis** sp. n.  
 Synopsis. See description, p.47; male genitalia: aedeagus as in figs. 53, 54.  
 Host. Unknown.  
 Distribution. Magallanes, Tierra del Fuego.
- 10 Third antennal segment black or at least darkened, brownish . . . . . 11  
 — Third antennal segment yellow . . . . . 23  
 11 Third antennal segment black . . . . . 12  
 — Third antennal segment paler, brownish, more yellow below . . . . . 15  
 12 Squamae and fringe yellow . . . . . ?*lolii* Spencer  
 (Scutellum normally entirely black, see couplet 8)  
 — Squamae grey, fringe dark, blackish . . . . . 13  
 13 Mesonotum shining black . . . . . **schwabei** Spencer  
 Synopsis. Frons yellow, orbits darkened to below lower ori; third antennal segment predominantly black, sometimes slightly paler below; pleura largely black apart from yellow notopleural area; scutellum bright yellow centrally; legs: femora black but all knees distinctly yellow; squamae yellow, fringe dark; wing length about 2 mm, last section of M 3+4 twice length of penultimate; male genitalia: aedeagus as in fig. 55.  
 Host. Poaceae but no reared specimens known.  
 Distribution. Santiago; new records: Curico, Cahon de Rio Claro, S. E. of Los Quenes, 1100 m, Malaise, 1 ♀, 8. X. 66 (E. I. SCHLINGER); Elqui, Alcoguas, 1560 m, 1 ♂, 18. I. 78 (K.A.S.); Limarí, Paloma, 2 ♂♂, 4 ♀♀, 19. I. 78; Recoleta, 2 ♀♀, same date (K.A.S.).  
 Reference. SPENCER (1963: 368).
- Mesonotum mat, greyish-black . . . . . 14  
 14 Acr sparse, in 2 rows . . . . . **Phytoliriomyza mucarensis** sp. n.  
 — Acr in 3–4 rows . . . . . **Phytoliriomyza nigrescens** sp. n.  
 15 Outer cross-vein lacking . . . . . **Haplopedes** sp.  
 — Outer cross-vein present . . . . . 16  
 16 2+1 dorso-centrals . . . . . 17  
 — 3+1 dc . . . . . 18  
 17 Large species, wing length from 2.60 mm in male to 2.75 mm in female; mesopleura entirely black . . . . . **chilensis** (Malloch)  
 Synopsis. Frons bright yellow, orbits slightly darkened (more so in male from Chiloe); mesonotum shining black, acr in some 6 rows; legs black, knees bright yellow (less so in specimen from Chiloe); wing with discal cell large, last section of M 3+4 only 1½ times length of penultimate; male genitalia: aedeagus as in figs. 56, 57 (Chiloe), sperm pump exceptionally large.  
 Host. Unknown.

Distribution. Llanquihue: new record: Chiloe, 1 ♂, 17—31. I. 62 (Peña, CNC).

References. MALLOCH (1934: 469); SPENCER (1963: 361).

— Smaller species, wing length in male 2.1 mm; mesopleura yellow diagonally on upper and rear half . . . . . cekalovici sp. n.

Synopsis. See description, p.43; male genitalia: aedeagus as in figs. 58, 59.

Host. Unknown.

Distribution. Concepcion.

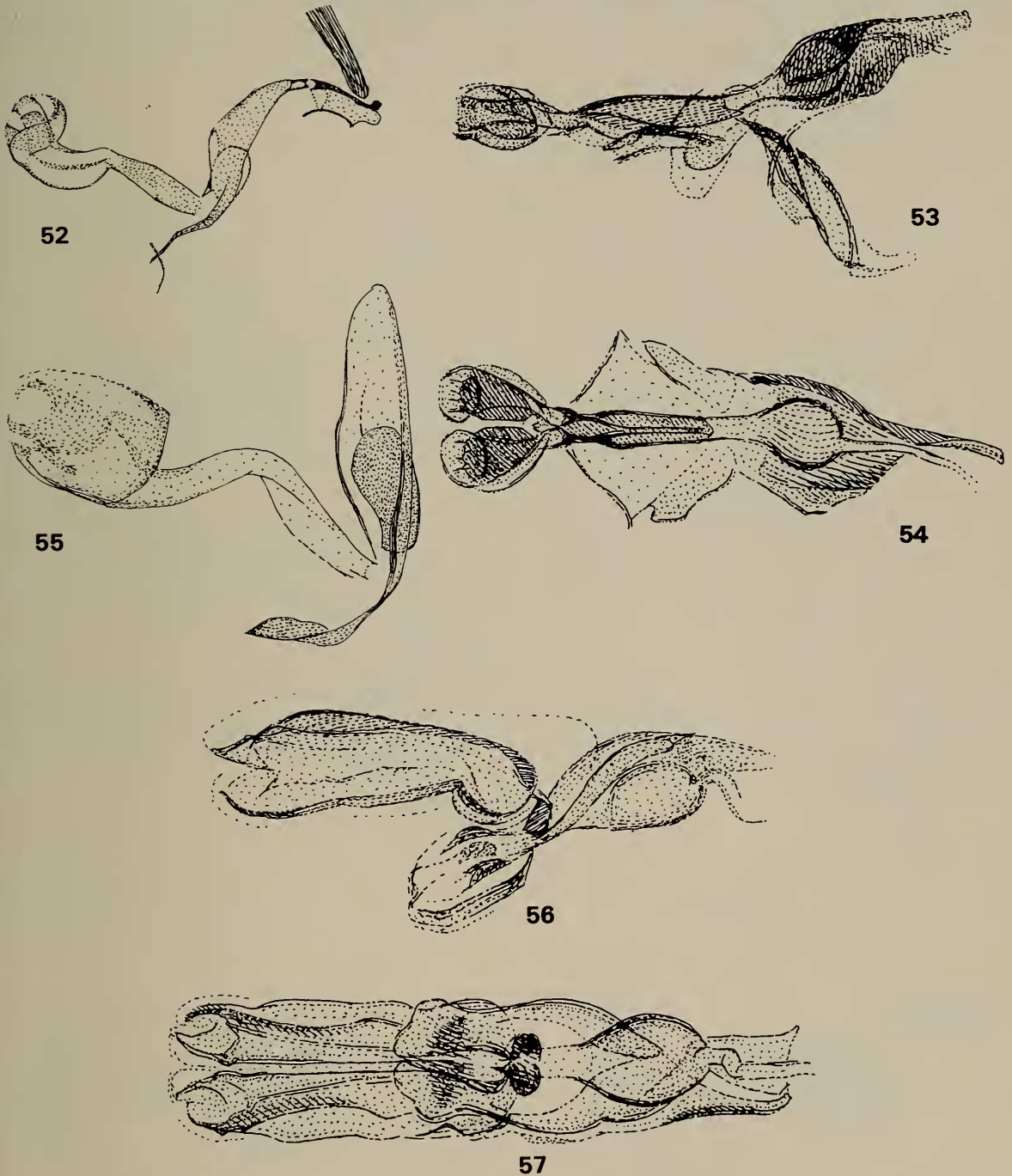
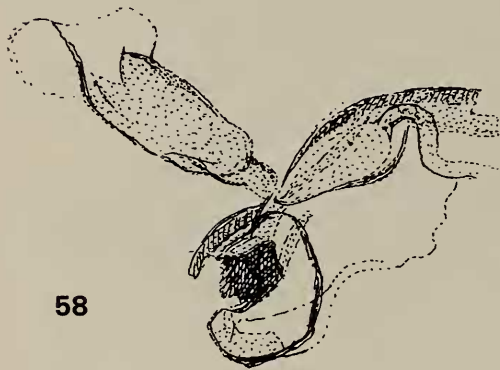


Fig. 52. *Liriomyza peullae*, aedeagus, side view.  
 Figs. 53, 54. *Liriomyza patagoniensis*, aedeagus. — 53. side view, — 54. ventral view.  
 Fig. 55. *Liriomyza schwabei*, aedeagus, side view.  
 Figs. 56, 57. *Liriomyza chilensis*, aedeagus. — 56. side view, — 57. ventral view (Chiloe).

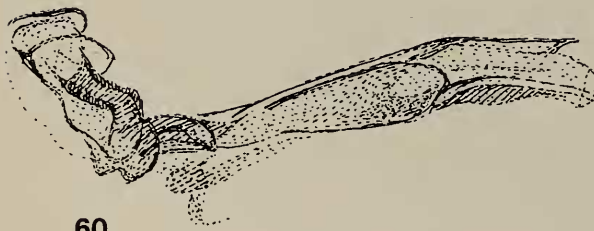
- 18 Mesonotum deep black, shining . . . . . 19  
 — Mesonotum mat, black or grey . . . . . 22  
 19 Third antennal segment uniformly dark brown . . . . . *concepcionensis* sp. n.  
 Synopsis. See description, p.44; male genitalia: aedeagus as in figs. 60, 61.  
 Host. Unknown.  
 Distribution. Concepcion.  
 — Third antennal segment brownish above, more yellow below . . . . . 20  
 20 Femora black, yellow only at knees . . . . . *cortesi* sp. n.  
 Synopsis. See description, p.45; male genitalia: aedeagus (figs. 62, 63) ending in  
 paired tubules.  
 Host. Unknown.  
 Distribution. Tarapacá.  
 — Femora predominantly bright yellow . . . . . 21



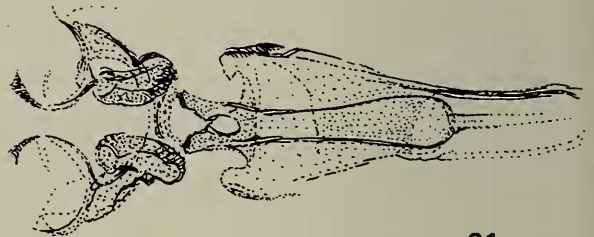
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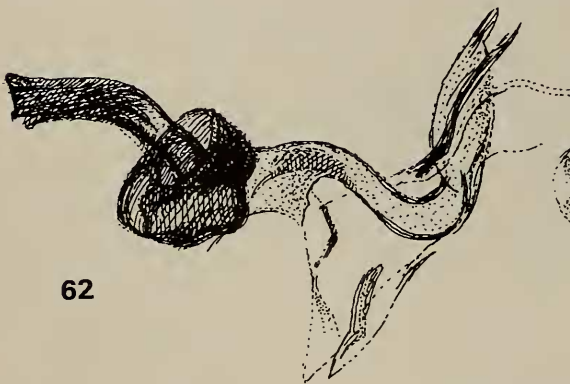
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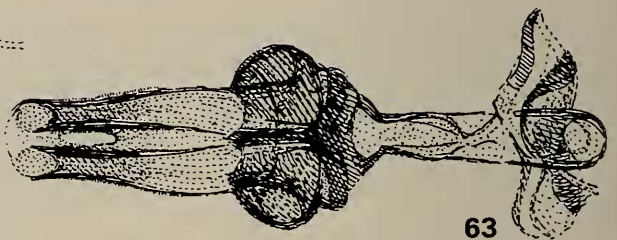
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62



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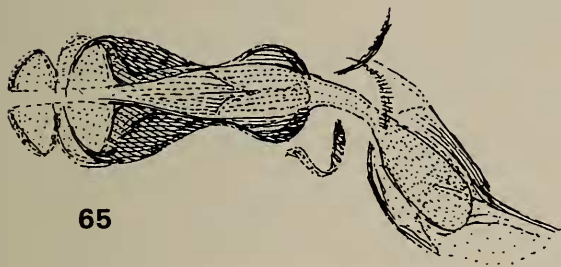
Figs. 58, 59. *Liriomyza cekalovici*, aedeagus. — 58. side view, — 59. ventral view.  
 Figs. 60, 61. *Liriomyza concepcionensis*, aedeagus. — 60. side view, — 61. ventral view.  
 Figs. 62, 63. *Liriomyza cortesi*, aedeagus. — 62. side view, — 63. ventral view.



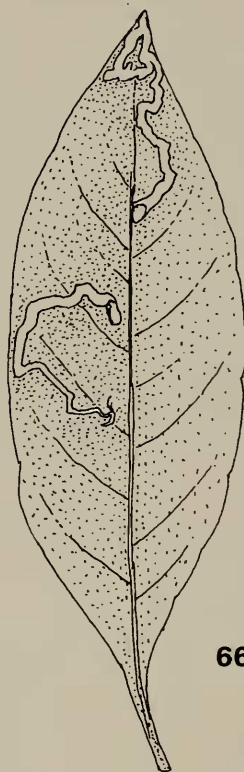
- 21 Femora narrowly black basally . . . . . *cestri* sp. n.  
 Synopsis. See description, p.44; male genitalia: aedeagus as in figs. 64, 65.  
 Host. *Cestrum parqui*, larva forming upper surface linear mine (fig. 66), pupating externally.  
 Distribution. Elqui, Quillota, Santiago.
- Femora predominantly yellow but with irregular brownish striations *elquensis* sp. n.  
 Synopsis. See description, p.45; male genitalia: aedeagus as in figs. 67, 68; sperm pump (fig. 69) with blade exceptionally wide.  
 Host. Unknown.  
 Distribution. Elqui.



64



65



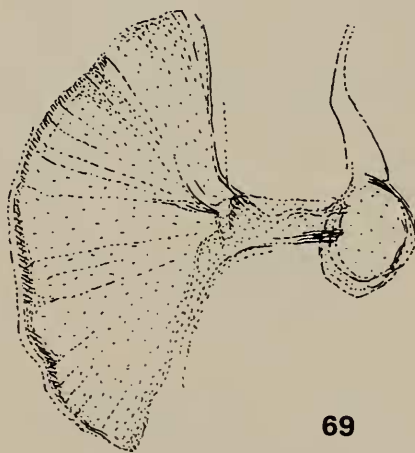
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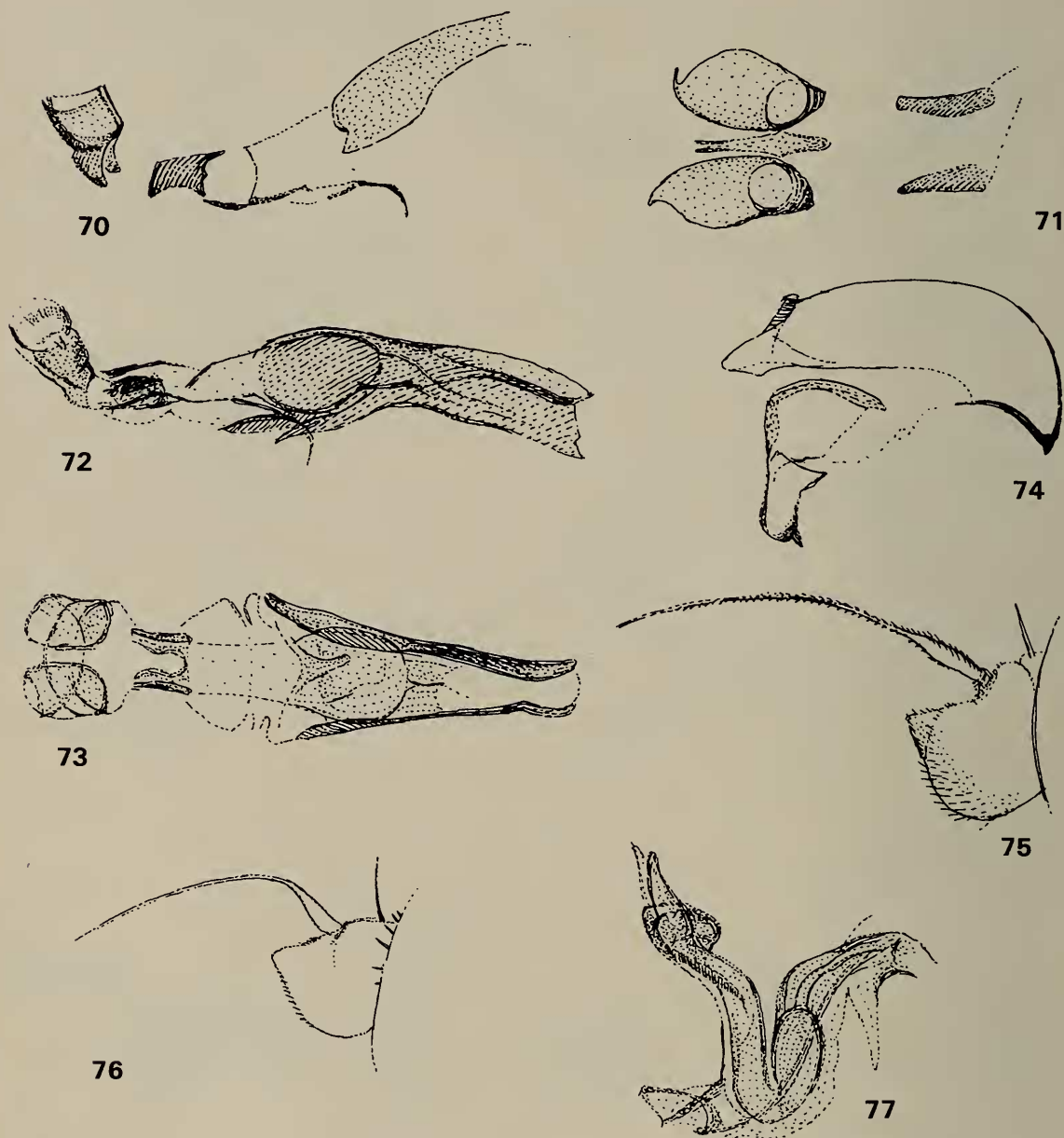
69

- Figs. 64—66. *Liriomyza cestri*. — 64. aedeagus, side view, — 65. same, ventral view, — 66. leafmine on *Cestrum parqui*.
- Figs. 67—69. *Liriomyza elquensis*. — 67. aedeagus, side view, — 68. same, ventral view (basal section damaged), — 69. sperm pump.

22 Mesonotum distinctly black, at most blackish-grey; hind-margin of eye dark

..... *huidobrensis* (Blanchard)

Synopsis. Frons yellow, generally somewhat orange, upper orbits darkened to upper ors, both vt on dark ground; third antennal segment normally brownish-yellow, in palest specimens darkening only faint; mesopleura variable but generally black on lower three-quarters; legs: coxae yellowish-black, femora essentially yellow but darkened with black striations, sometimes appearing almost completely black but always yellowish on underside; squamae yellow, margin and fringe black; wing from 1.70—2.25 mm, discal cell large, last section of vein M 3+4 from slightly less than 2 to 2¼ times length of penultimate; male genitalia: aedeagus (figs. 70, 71) with distiphallus divided and paired sclerites behind.



Figs. 70, 71. *Liriomyza huidobrensis*. — 70. aedeagus, side view, — 71. distiphallus, ventral view.  
 Figs. 72—74. *Liriomyza tumbrensis*. — 72. aedeagus, side view, — 73. same, ventral view, — 74. surstylus.  
 Fig. 75. *Liriomyza cruciata*, third antennal segment (Vicuña).  
 Figs. 76, 77. *Liriomyza vicunella*. — 76. third antennal segment, — 77. aedeagus, side view.

Hosts. A highly polyphagous species, bred originally from *Cineraria* in Argentina; following hosts known in Chile: Asteraceae: *Bidens pilosa*, *Calendula* sp., *Sonchus oleraceus*; Brassicaceae: *Sisymbrium* sp.; Fabaceae: *Galega officinalis*, *Medicago sativa*, *Vicia faba*; Malvaceae: *Althaea rosea*; Solanaceae: *Datura stramonium*; Tropaeolaceae: *Tropaeolum majus*; larva forms an irregular linear mine which frequently follows the midrib or a lateral vein, with offshoots into the leaf-blade; posterior spiracles of larva (puparium) each with an ellipse of 6—8 bulbs. Distribution. Widespread and common from Tarapacá to Valdivia; highest recorded altitude in Chile Alcoguas, Elqui, 1760 m (K.A.S.); Argentina, Brazil, Peru, Venezuela; California.

References. BLANCHARD (1926: 10); AGUILERA [1972 (biology, as *L. langei*)]; SPENCER [1964 (Juan Fernandez Is. as *L. bryoniae*; 1973a (economic importance); 1973b (Venezuela); 1981 (California)].

Note. It is possible that *L. pagana* (MALLOCH 1934: 475) represents a synonym of *L. huidobrensis*. *L. pagana* was described from a single female from the eastern shore of Lake Nahuel Huapi, Rio Negro, Argentina. BLANCHARD (1954: 33) commented on the similarity of the two species but suggested that *pagana* could be differentiated by the presence of an intraalar bristle. I can confirm after examining the holotype of *L. pagana* that this bristle is present and this suggests that the two species are distinct. However, it will be of interest to examine a male from the Lake Nahuel Huapi area in due course which can be associated with the female holotype to confirm its affiliations.

— Mesonotum pale grey; hind-margin of eye yellow . . . . . **tumbrensis** sp. n.  
Synopsis. See description, p.48; male genitalia: aedeagus as in figs. 72, 73; surstyli long, narrow, epandrium strongly sclerotized at hind-corner (fig. 74).

23 Third antennal segment angulate at upper corner (figs. 75, 76) . . . . . 24

— Third antennal segment rounded . . . . . 25

24 Outer cross-vein lacking; mesonotum mat grey **cruciata** (Blanchard), new combination  
Synopsis. Frons and all antennal segments yellow, upper orbit blackish; third antennal segment (fig. 75) with angular projection but without spine; mesonotum with 3+1 strong dc, acr sparse, in at most 2 rows or lacking; legs largely yellow; wing length 2 mm in female; scutellum with 2 pairs of scutellars; male unknown. Host. *Avena sativa* (trigo), larva forming leaf-mine but further details not recorded.

Distribution. New to Chile. Elqui, Vicuña, 1 ♀, 20. X. 77 (H. VASQUEZ); 1 ♀, 18. I. 78 (K.A.S.); Argentina, La Pampa; new record: Chubut, 19.9 km N. of Malaspine Lake, 550 m, 13. XII. 66 (E. I. SCHLINGER, M. E. IRWIN).

References. BLANCHARD (1938: 356); FRICK [1952: 399 (as *Cerodontha*)]; SPENCER [1963: 331 (as *Cerodontha*)].

Note. This species was described in the new genus *Triticomyza*. FRICK (loc. cit.) synonymised *Triticomyza* with *Cerodontha* and the synonymy was followed by SPENCER (1963). However, examination of the three specimens now recorded in Chile shows that the species clearly belongs in *Liriomyza* and *Triticomyza* is therefore now synonymised with *Liriomyza*, new synonymy.

— Outer cross-vein present; mesonotum black . . . . . **vicunella** sp. n.  
Synopsis. See description, p. 48; third antennal segment as in fig. 76; male genitalia: aedeagus with membranous extensions to distiphallus (fig. 77).

Host. Unconfirmed but certainly Poaceae.

Distribution. Elqui.

25 Femora black, with knees yellow . . . . . 26

— Femora largely yellow . . . . . 29

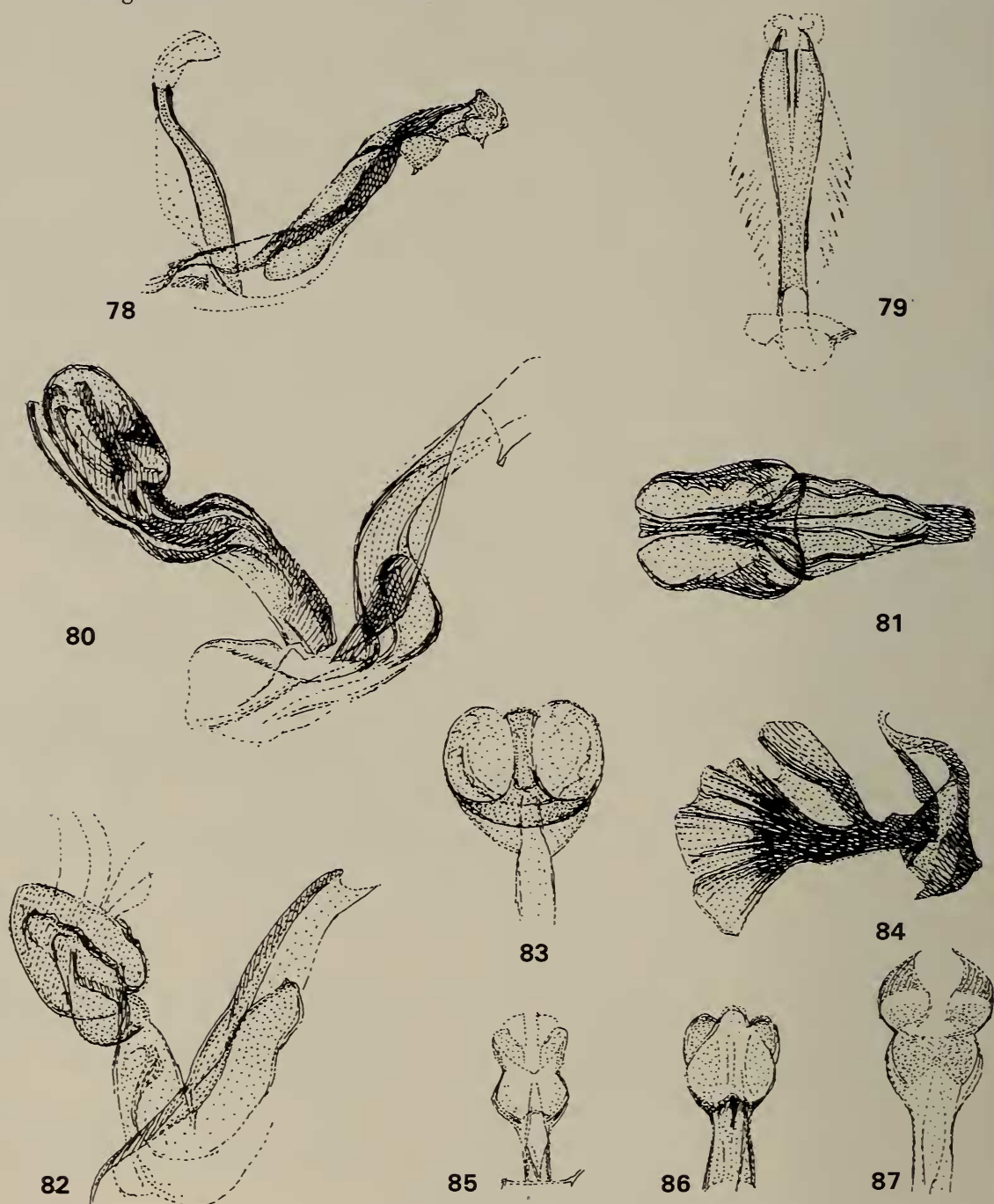
26 Mesonotum shining black . . . . . **politella** (Malloch)

Synopsis. Frons, face, all antennal segments and palps bright yellow; orbits variably darkened, even entirely black; 2 ors, 2 ori; legs with knees bright yellow for slightly more than femoral diameter; wing length from 1.25—1.50 mm (Chile), in female holotype (Argentina) 2 mm; front tergites yellow laterally; male genitalia: aedeagus as in figs. 78, 79; sperm pump with narrow stalk and scarcely widening blade, all strongly pigmented.



Host. Unknown.

Distribution. Valparaíso, Valparaíso; new records: Concepcion, Lenga, 1 ♀, 8. I. 78 (K.A.S.); Elqui, R. Elqui, 1 ♀, 8. II. 78 (K.A.S.); Santiago, Rincoñada Maipú, 1 ♀, 14. V. 66 (N. HICHINS and M. E. IRWIN); Quillota, La Quillota, 1 ♀, 6. I. 78 (K.A.S.); Tarapacá, Azapa Valley, 1 ♀, 26. IX. 66 (M. E. IRWIN); Argentina: Rio Negro Prov.



- Figs. 78, 79. *Liriomyza politella*. — 78. aedeagus, side view, — 79. distiphallus, antero-ventral view.
- Figs. 80, 81. *Liriomyza navarinensis*. — 80. aedeagus, side view, — 81. distiphallus, ventral view.
- Figs. 82—84. *Liriomyza penella*. — 82. aedeagus, side view, — 83. distiphallus, ventral view, — 84. sperm pump.
- Figs. 85—87. Distiphallus of *Liriomyza sativae*. — 85. *Liriomyza sativae*; — 86. sp. 1, nr. *sativae*; — 87. sp. 2, nr. *sativae*.

References. MALLOCH (1934: 473); SPENCER (1963: 365).

Note. The unique female holotype is from Viedma at the mouth of the Rio Negro. This agrees so exactly with the specimens now seen from Chile that despite the distance of the type locality from those in Chile, there is little reasonable doubt that the species is in fact widely distributed and that the Chilean populations do represent *politella*.

- Mesonotum mat, grey or blackish grey . . . . . 27
- 27 Mesonotum grey; large species, wing length in male 3 mm . . . . . *navarinensis* sp. n.  
Synopsis. See description, p.46; male genitalia: aedeagus as in figs. 80, 81.  
Host. Unconfirmed but certainly Poaceae (deduced from male genitalia).  
Distribution. Magallanes, Tierra del Fuego.
- Mesonotum darker, blackish-grey; smaller species, wing length in male at most 2.3 mm . . . . . 28
- 28 Discal cell small, last section of vein M 3+4, 3 times length of penultimate *penella* sp. n.  
Synopsis. See description, p.47; male genitalia: aedeagus as in figs. 82, 83; sperm pump as in fig. 84.  
Host. Unknown.  
Distribution. Magallanes, Tierra del Fuego.
- Discal cell large, last section of M 3+4 only slightly longer than penultimate . . . . . *Phytoliriomyza magellani* sp. n.
- 29 Large species, wing length in female 3.6 mm . . . . . *simulator* (Malloch)  
Synopsis. Frons and antennae bright yellow; orbits not darkened, vti on yellow ground; 2 ors, 2 ori, orbital setulae sparse, reclinate; mesonotum deep black, moderately but not brilliantly shining; 3+1 strong dc, acr in 4 rows; mesopleura black on lower three-quarters; legs: coxae and femora yellow, tibiae and tarsi brownish; wing with discal cell large, last section of vein M 3+4 only slightly longer than penultimate, squamal fringe and margin black; male genitalia: unknown.  
Host. Unknown.  
Distribution. Llanquihue, Casa Pangue (on Argentina border).  
Reference. MALLOCH (1934: 474).
- Smaller species, wing length at most 2.25 mm . . . . . 30
- 30 Mesonotum distinctly mat . . . . . *huidobrensis* (Blanchard)  
(Third antennal segment normally at least slightly darkened, couplet 22)
- Mesonotum shining black . . . . . 31
- 31 Sperm pump with narrow blade . . . . . *sativae* Blanchard  
Synopsis. Frons, jowls and all antennal segments bright yellow, hindmargin of eye black, vti just on dark ground; mesonotum shining black; mesopleura predominantly yellow but variably darkened along lower margin; legs: coxae and femora bright yellow, latter rarely with slight brownish striations; wing length 1.3—1.7 mm, discal cell small, last section of M 3+4 3 times length of penultimate; male genitalia: distiphallus in ventral view with distinctive curvature, as in fig. 85.  
Hosts. Only hosts known in Chile *Cucumis melo* and *Medicago sativa* but highly polyphagous, recorded on genera in seven families (SPENCER 1981) but occurring most commonly on the Cucurbitaceae, Fabaceae and Solanaceae.  
Distribution. New to Chile. Tarapacá, Arica, numerous specimens on and reared from *Medicago sativa*; Poconchile, 3 ♂♂, 2 ♀♀, 21. I. 78 on melon (all K.A.S.); Argentina, Brazil, Peru, Venezuela; widespread in southern states of U.S.A.  
References. BLANCHARD (1938: 354); SPENCER [1973a (economic importance); 1973b (Venezuela); 1981 (California)]; SPENCER & STEGMAIER [1973 (Florida)].  
Note. This is a most serious pest in Brazil, Venezuela and U.S.A., particularly in California and Florida.  
The aedeagus of two further closely related species which appear indistinguishable from *L. sativae* on external characters are shown in figs. 86, 87. It seems undesirable formally to describe these until the host plants can be discovered and confirmation of the genitalia differences is possible from reared specimens.  
Species 1. Elqui, Alcoguas, 1560 m, 2 ♂♂, 18. II. 78 (fig. 86).  
Species 2. Santiago, El Canelo, 1 ♂, 2 ♀♀, 2. I. 78 (fig. 87).

- Sperm pump with exceptionally broad blade . . . . . *elquensis* sp. n.  
(Third antennal segment faintly darkened, couplet 21.)

#### 4.7. Genus *Galiomyza* Spencer 1981

This genus was erected to accommodate the small group of species known in Europe, North America and Brazil with the frons and scutellum black and the third antennal segment bright yellow (scutellum also yellow in *G. morio* in Europe). Three species were retained in *Praspedomyza* Hendel by SPENCER (1966, 1969) but as the type of *Praspedomyza approximata* Hendel, is a true *Liriomyza*, the genus was synonymised with *Liriomyza* by SPENCER (1981: 289). *Galiomyza* is close to *Liriomyza* but the stridulating mechanism is lacking and the inner margin of the epandrium is strongly sclerotized, sometimes with spines (fig. 90). Known hosts are *Galium* and *Viola*.

One new species from Curico is described below.

#### Key to *Galiomyza* species

- Head and body largely black, apart from bright yellow third antennal segment . . . . . *australis* sp. n.  
Synopsis. See description, p. 49; male genitalia: aedeagus as in figs. 88, 89; epandrium with 2 short spines on inner margin and also 2 at hind-corner (fig. 90).  
Distribution. Curico; Argentina, Rio Negro.  
Host. Unknown.

#### 4.8. Genus *Haplopeodes* Steyskal 1980

This genus was erected to provide a new name for *Haplomyza* Hendel, following the discovery by STEYSKAL (1980) that the type of *Haplomyza*, *Antineura togata* Melander, correctly belongs in *Liriomyza*, *Haplomyza* thus becoming a synonym of *Liriomyza*.

Superficially, adults in this genus resemble *Liriomyza* species. Normally the mesonotum is mat grey but may be yellowish centrally adjoining the scutellum; the acrostichals are in 2 rows, the outer cross-vein is lacking and there is only a single upper orbital. However, some *Liriomyza* species may have this combination of characters and the only essential difference is the absence of the stridulating mechanism, which is always present in males of *Liriomyza*.

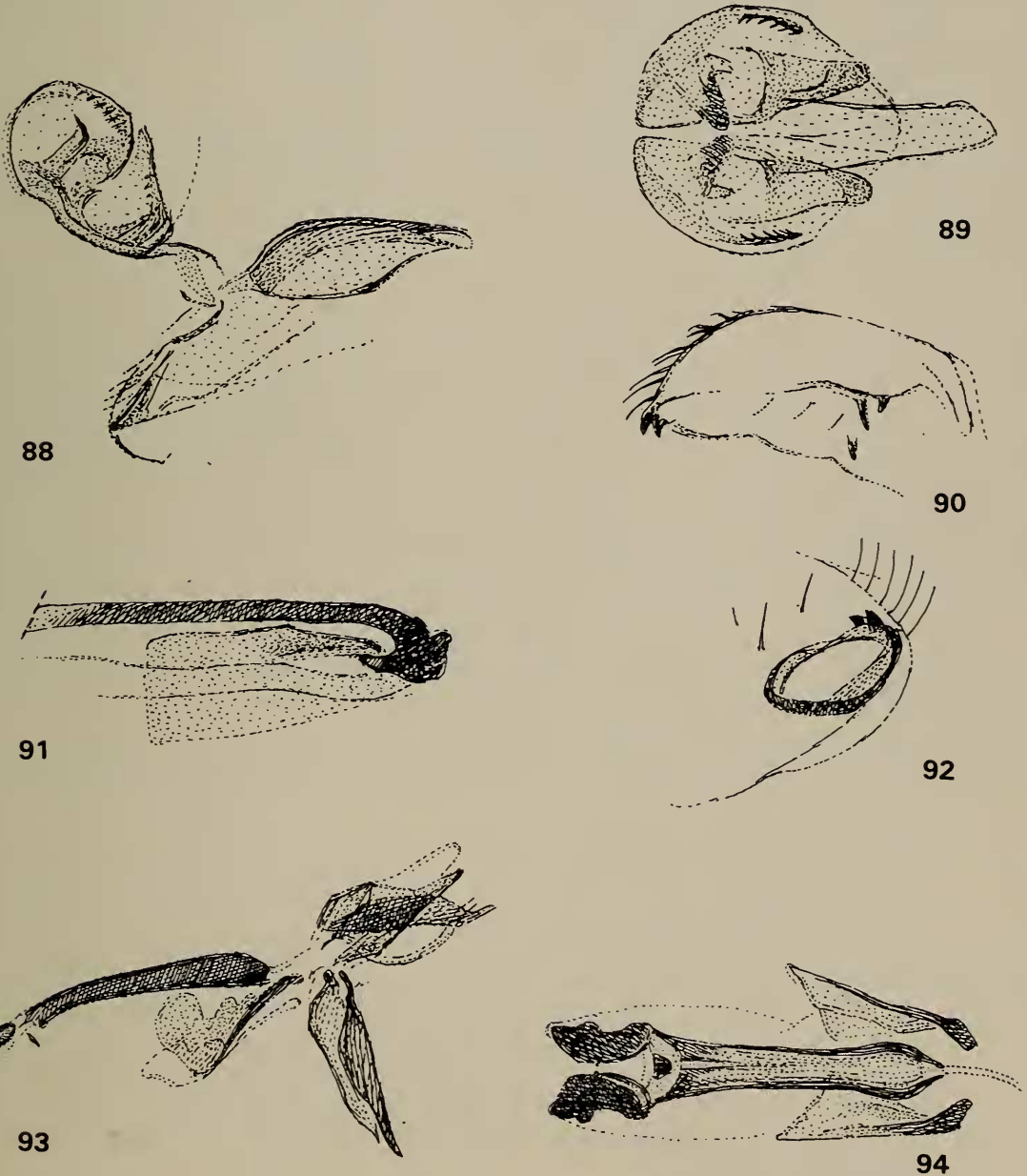
*Haplopeodes* is only known in North and South America and 12 species have now been described. Hosts are known in the Amaranthaceae, Chenopodiaceae, Portulacaceae and Solanaceae. Positive identification of caught specimens is difficult, even with males, as the male genitalia are greatly reduced and little differentiated, even between species which are certainly distinct.

No reared specimens are known in Chile but two adults have been seen from Elqui. The species is not positively identified and may represent either *H. tigreensis* (Spencer) which was reared from an unidentified host at Buenos Aires or *H. kefi* Steyskal, following the discovery at Cordoba, Argentina (Valladares) of a species on *Lycium* and *Salpichroa* (Solanaceae) which has been tentatively identified as *H. kefi*. This was previously known in California and Texas.



Key to *Haplopeodes* species

- Single ors, outer cross-vein lacking . . . . . (*tigrensis* Spencer/*kefi* Steyskal)  
 Synopsis. Head largely yellow, including entirely hind-margin of eye but third antennal segment slightly darkened, brownish; 1 ors, 3 ori, ors further from eye margin than ori, orbital setulae very sparse, reclinate; eye conspicuously slanting, jowls broad, 1/2 height of eye; mesonotum uniformly grey to margin of scutellum, almost silvery, scutellum yellow centrally; humerus, notopleural triangle and upper half of mesopleura diagonally yellow, grey below; legs: coxae and femora bright yellow, tibiae and tarsi yellowish-brown; squamae yellowish-grey, margin and fringe pale; wing length 1.50—1.75 mm; male genitalia: aedeagus (fig. 91) greatly reduced, distiphallus extended but largely membranous; sperm pump with long, narrow blade; surstyli (fig. 92) discrete, bearing 2 strong denticles.



- Figs. 88—90. *Galiomyza australis*. — 88. aedeagus, side view, — 89. distiphallus, ventral view, — 90. epandrium.  
 Figs. 91, 92. *Haplopeodes* sp. — 91. aedeagus, — 92. surstylus.  
 Figs. 93, 94. *Calycomyza chilena*, aedeagus. — 93. side view, — 94. ventral view.

Distribution. Elqui, Alcoguas, 1560 m, 1 ♂, 1 ♀, 18. I. 78; Argentina, U.S.A.  
Hosts. ? Amaranthaceae, Solanaceae.

References. SPENCER (1963: 375); STEYSKAL (1980: 146).

Note. The surstyli in the male from Elqui differ from other species in having only 2 denticles (fig. 92) but insufficient material has been examined to know to what extent this character may be variable or of specific significance.

#### 4.9. Genus *Calycomyza* Hendel

Three species can now be recorded: one, described as new from central Chile and two, which are widespread in the Neotropical region and southern United States, only known north of the desert at Arica. Further females have been seen from Cautin, Curico and Elqui, almost certainly representing two additional species but it is undesirable to describe these in the absence of males.

Twenty species were treated in the Neotropical Region by SPENCER (1963) and 19 further species have been described from southern Florida, the Caribbean area and Venezuela (SPENCER & STEGMAIER 1973; SPENCER 1973b). Distribution of the genus substantially diminishes southwards and only 9 species are known in Argentina (VALLADARES 1982).

#### Key to *Calycomyza* species

- 1 Squamal fringe pale, whitish, orbits conspicuously black; . . . . . *chilena* sp. n.  
Synopsis. See description, p.50; male genitalia: figs. 93, 94, with distal processes angular, mesophallus long, slender, front ventral lobes conspicuously elongated.  
Host. Unknown.  
Distribution. Elqui, Santiago.
- Squamal fringe dark; orbits not dark below lower ors . . . . . 2
- 2 Very small species, wing length 1.6—2.0 mm . . . . . *malvae* (Burgess)  
Synopsis. Orbits black to upper ors or slightly beyond; mesonotum moderately shining black; legs entirely black; squamae grey, margin and fringe black; male genitalia: aedeagus with divided apical section of distiphallus having membranous extensions laterally, mesophallus short, not greatly swollen (cf. SPENCER & STEGMAIER 1973: figs. 197, 198).  
Host. Malvaceae, particularly genera *Malva* and *Sida*, larva forming short, irregular linear mine, pupating externally; puparium yellowish brown, posterior spiracles each with 3 bulbs.  
Distribution. New to Chile: Tarapacá, Arica, 2 ♂♂, 1 ♀, emerged 6. II. 78 from leafmines on *Malva parviflora* coll. 23. I. 78 (N. HICHINS); Brazil, Venezuela, Caribbean area, U.S.A.  
References. SPENCER & STEGMAIER (1973: 81); SPENCER (1973b: 45).
- Slightly larger species, wing length 1.8—2.2 mm . . . . . *ipomaeae* (Frost)  
Synopsis. Generally resembling *C. malvae* but mesonotum less shining, legs with fore-knee slightly yellowish; male genitalia: aedeagus with apical section of distiphallus extended with 2 short, broad tubules, mesophallus short, broad, almost spherical in ventral view (cf. SPENCER & STEGMAIER 1973: figs. 181, 182).  
Host. *Ipomoea* spp. larva forming irregular linear mine which may appear almost blotch-like.  
Distribution. New to Chile: Tarapacá, Arica, Museo, 2 ♀♀, on *Ipomoea*, 6. II. 78 (K.A.S.); Brazil, Venezuela, Caribbean area, Florida.  
References. SPENCER & STEGMAIER (1973: 76; 1973b: 44).

4.10. Genus *Phytoliriomyza* Hendel

Ten species are now known from Chile (including the Juan Fernandez Is.). Six new species are described and one semi-cosmopolitan species, *P. arctica*, is recorded for the first time in Chile. Two additional species are known from Brazil (SPENCER 1963) and three further species were described from Venezuela (SPENCER 1973b).

*Phytoliriomyza kuscheli* (SPENCER 1964), **comb. nov.** from the Juan Fernandez Is. was described in *Liriomyza* before the male genitalia of *Phytoliriomyza* species were fully understood but it is now clear that this species correctly belongs here. The aedeagus and epandrium, which has characteristic rows of strong bristles along the inner margin and also 6 strong bristles on the surstylus, were illustrated by SPENCER (1964: fig. 1a—1c). A single male has now been seen from mainland Chile in Cachapoal Prov.

Key to *Phytoliriomyza* species

- 1 Third antennal segment conspicuously elongate (fig. 95) . . . . . **frontalis** sp. n.  
Synopsis. See description, p. 51; male genitalia unknown.  
Host. Unknown.  
Distribution. Santiago.
- Third antennal segment at most slightly longer than broad (fig. 96) . . . . . 2
- 2 Third antennal segment black . . . . . 3
- Third antennal segment paler, at most yellowish-brown . . . . . 5
- 3 Orbital setulae proclinate (fig. 96); halteres black . . . . . **aysensis** sp. n.  
Synopsis. See description, p. 50; male genitalia unknown.  
Host. Unknown.  
Distribution. Aysen.
- Orbital setulae upright or reclinate; halteres yellow . . . . . 4
- 4 Scutellum bright yellow centrally . . . . . **mucarensis** sp. n.  
Synopsis. See description, p. 52; male genitalia: aedeagus (figs. 97, 98) with distiphallus divided into paired, funnel-like tubules; inner margin of epandrium (fig. 99) strongly sclerotized, bearing strong hairs, no surstylus present.  
Distribution. Antofagasta, Andes, 4000 m.
- Scutellum black, at most faintly yellow from rear . . . . . **nigrescens** sp. n.  
Synopsis. See description, p. 52; male genitalia: aedeagus (figs. 100, 101) with distiphallus divided into paired slender tubules; epandrium (fig. 102) with inner margin bearing 2 strong bristles at hind-corner and one on front corner (representing surstylus).  
Host. Unknown.  
Distribution. Antofagasta, Andes, 4000—4200 m.
- 5 Orbital setulae reclinate . . . . . 6
- Orbital setulae proclinate . . . . . 7
- 6 Mesopleura largely black, only narrowly yellow along upper margin **magellani** sp. n.  
Synopsis. See description, p. 51; male genitalia: aedeagus broad, undivided (figs. 103, 104); epandrium heavily sclerotized along inner margin, with a strong projection at midpoint, no developed surstylus (fig. 105).  
Host. Unknown.  
Distribution. Magallanes, Tierra del Fuego.
- Mesopleura almost entirely bright yellow, at most faintly darkened on lower margin . . . . . **kuscheli** (Spencer), new combination  
Synopsis. Frons, orbits, jowls and antennae bright yellow; hind-margin of eye black, with inner vertical on black; mesonotum shining black, 3+1 dc, acr in 4 rows, those behind incurved; side of thorax largely yellow; legs: femora bright yellow, tibiae and tarsi yellowish-brown; wing length 2.2 mm, discal cell large, last section of M 3+4 at most twice length of penultimate; male genitalia: aedeagus with long, narrow sclerites, extending each side of large central bladder; distiphall-



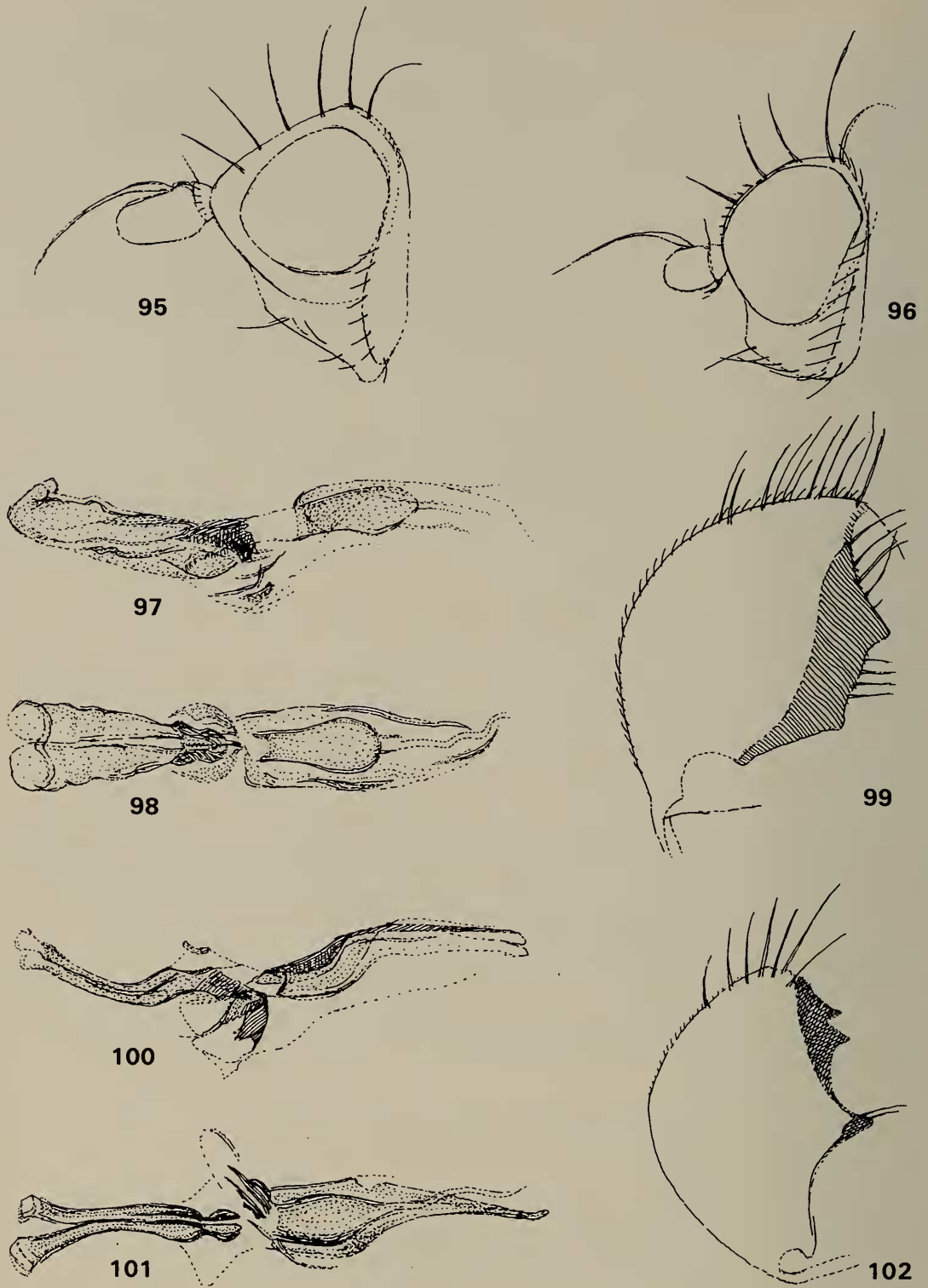


Fig. 95. *Phytoliriomyza frontalis*, head.

Fig. 96. *Phytoliriomyza aysensis*, head.

Figs. 97—99. *Phytoliriomyza mucarensis*, — 97. aedeagus, side view, — 98. same, ventral view, — 99. epandrium.

Figs. 100—102. *Phytoliriomyza nigrescens*. — 100. aedeagus, side view, — 101. same, ventral view, — 102. epandrium.

lus divided, symmetrical, rounded; surstyli discrete, each with 6 strong bristles, inner margin of epandrium with up to 30 strong bristles (cf. SPENCER 1964: figs. 1a—1c).

Host. Unknown.

Distribution. New to mainland Chile. Cachapoal (formerly O'Higgins), Graneros, Bosque de los Conservadores, 1100 m, 1 ♂, 1.—4. III. 62 (L. PEÑA); Juan Fernandez Is.

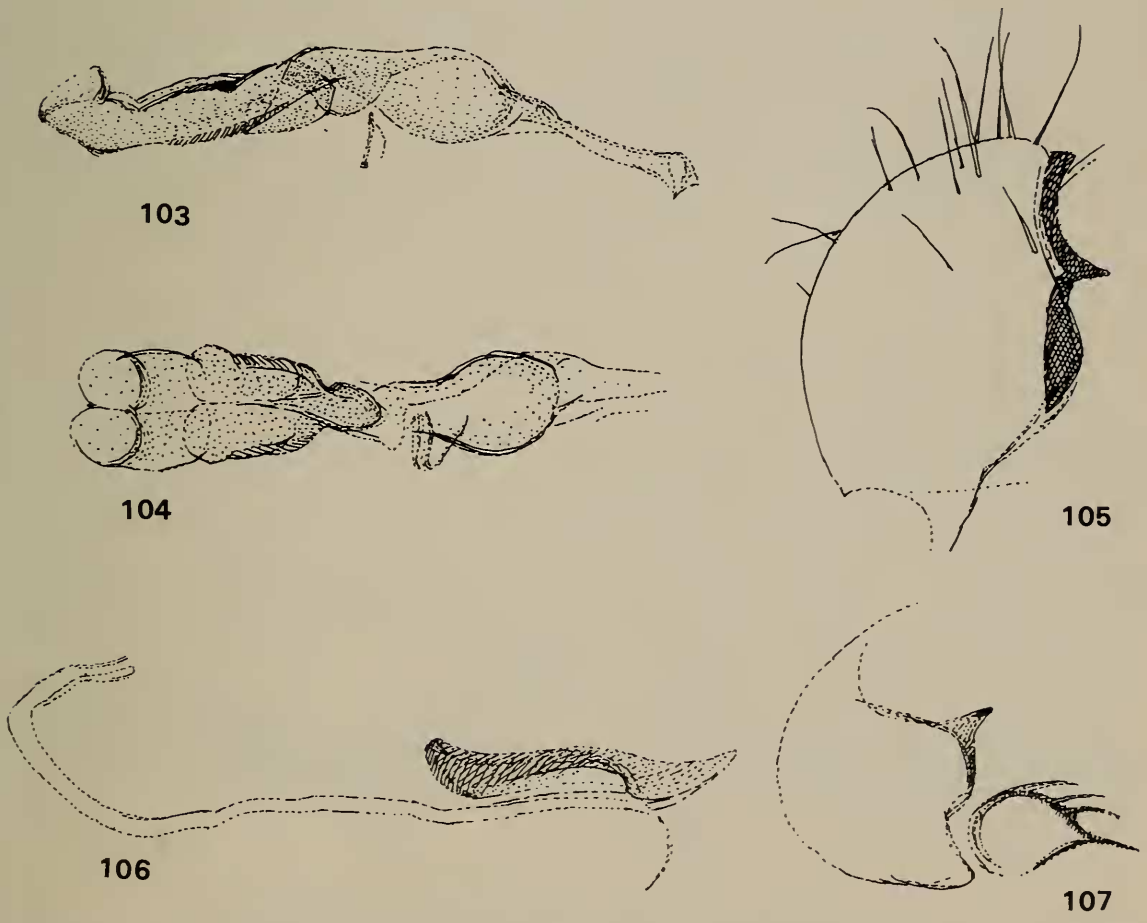
Reference. SPENCER (1964: 253).

Note. The strong bristles on both surstyli and inner margin of the epandrium clearly indicate the correct generic position of this species in *Phytoliriomyza*. Externally — apart from the lack of a stridulating mechanism — the species appears like a typical *Liriomyza* and it was described in this genus before the significance of the internal bristles was appreciated. In the description (SPENCER 1964) it was stated that the holotype of this species and also of *P. longipenis* were deposited in the Museo Nacional, Santiago. However, this is incorrect and the holotypes were retained by Dr. KUSCHEL who collected them and are now in the New Zealand National Arthropod Collection, Entomology Division, D.S.I.R., Auckland, N.Z.

7 Small species, wing length 1.6—2.0 mm . . . . . 8

— Larger species, wing length 2.0—2.5 mm . . . . . *imperfecta* (Malloch)

Synopsis. Frons yellowish or somewhat darker; 2 ors, 1 ori; orbital setulae distinctly proclinate; mesonotum with brownish undertone, sometimes with a faintly paler central band; scutellum yellow centrally; acr sparse, in 2 rows; pleura



Figs. 103—105. *Phytoliriomyza magellani*. — 103. aedeagus, side view, — 104. same, ventral view, — 105. epandrium.  
 Figs. 106, 107. *Phytoliriomyza nublensis*. — 106. aedeagus, side view (1/2 scale of surstylus), — 107. surstylus.

yellowish; legs yellow with variable darker striations; halteres predominantly yellow but knob darkened, at least faintly brownish; wing length from 2.0 mm in male to 2.5 mm in female, last section of M 3+4 less than twice penultimate; male genitalia: aedeagus ending in long, paired tubules; sperm pump with blade large, fan-like; surstylus with a comb of 6 black bristles, inner margin of epandrium with numerous irregular bristles (SPENCER 1981: figs. 979—982).

Host. Unknown.

Distribution. Llanquihue, Puerto Varas (holotype); new records: Bio-bio, El Abanico, 1 ♂, 31. XII. 50 (ROSS & MICHELBACHER); Santiago, 1 ♂, Quebrada de la Plata, Maipú, 450—600 m, 33° 30' S, 70° 55' W, 11. X. 66 (E. I. SCHLINGER, M. E. IRWIN); Valparaíso, Villa Alemana, 1 ♀, 25. IX. 60 (L. CALTAGIRONE); Florida, widespread in California.

References. MALLOCH (1934: 474); SPENCER (1981: 324).

- 8 Male genitalia: aedeagus with tubules fully fused, appearing as a single broad tubule (fig. 106) . . . . . **nublensis sp. n.**

Synopsis. See description, p.53; surstyli discrete, with one long bristle and several bristle-like hairs (fig. 107), epandrium with a strong projection at hind-corner.

Host. Unknown.

Distribution. Malleco, Nuble.

- Male genitalia: aedeagus a longer, largely membranous tubule forming several coils (cf. SPENCER 1981: fig. 977) . . . . . **arctica (Lundbeck)**

Synopsis. Colour of head variable, normally yellowish-brown; third antennal segment slightly darkened, yellowish-brown; mesonotum with acr in 2 rows; legs largely yellowish; wing with discal cell relatively large, last section of M 3+4 rarely more than 1½ times length of penultimate; male genitalia: sperm pump minute, hypandrium narrowing distally; surstyli with only a few weak hairs on inner corner (cf. SPENCER 1981: figs. 976—978).

Host. Asteraceae, once reared from stems of *Sonchus* in Europe, associated with *Solidago* in Canada, no host known in Chile.

Distribution. New to Chile. Cautin, Vulcan Llaime, near Refugio, 1 ♂, 10. I. 78 (K.A.S.); Bolivia, La Paz, Brazil, U.S.A., Canada, Greenland (type locality), Europe, Formosa, Sri Lanka.

References. SPENCER (1963: 377; 1981: 315).

#### 4.11. Genera *Phytomyza* Fallén and *Chromatomyia* Hardy

*Phytomyza* is the largest world genus, with over 450 known species but occurs predominantly in the northern hemisphere. Five species can now be recorded in Chile, of which two from Patagonia are described as new and one, *P. crassiseta*, is new to Chile. Leaf-mines were found on *Ranunculus repens* in the grounds of the University at Valdivia, 12. I. 78 but unfortunately all were empty and positive identification of the species is not possible. It nevertheless seems probable that the mines are referable to the European species, *P. ranunculi* (Schrank), which may have been introduced together with its host.

*P. platensis*, previously known only in Argentina, is also now recorded from central Chile and is transferred to the genus *Chromatomyia*. As the adults of the two genera can only be separated by the male genitalia, *C. platensis* is included in the *Phytomyza* key below.

#### Key to *Phytomyza* and *Chromatomyia* species

- 1 Arista conspicuously thickened (fig. 108) . . . . . **crassiseta** Zetterstedt
- Synopsis. Frons, jowls and face yellow, orbits normally darkened at least to lower ors; third antennal segment slightly longer than broad, quadrate (fig. 108); mesonotum mat, ash-grey, acr sparse, at most in 2 rows; legs: fore-coxae yellow,



femora black, with yellow knees; squamae and fringe yellow; wing length up to 2 mm, second costal section short,  $1\frac{1}{2}$  times length of fourth; male genitalia: not known in North or South America.

Host. *Veronica* spp., larva forming short, irregular upper surface mine, pupating in leaf.

Distribution. New to Chile. Aconcagua, Piscicultura, 1600 m, 1 ♀, 11. XI. 63 (L. PEÑA); Curico, Estero la Jaula, *Nothofagus*, I. 64 (L. PEÑA); Santiago, Quebrada de la Plata, 550 m,  $33^{\circ}30'S$ ,  $70^{\circ}55'W$ , near Maipú, 4 ♀♀, 12. III. 66, Malaise; 1 ♀, 27. III. 66 (all M. E. IRWIN); U.S.A., Europe.

Reference. SPENCER (1981: 385).

Note. In North America this species appears to be parthenogenetic and, with only females known in Chile, it is apparently so here also. Males are not uncommon in Europe.

- Arista tapering normally . . . . . 2
- 2 Second costal section short, at most twice length of fourth . . . . . 3
- Second costal section longer,  $2\frac{1}{2}$ —3 times length of fourth . . . . . 4
- 3 Femora entirely black . . . . . *Chromatomyia platensis* (Brèthes), new combination

Synopsis. Frons largely yellow, frequently distinctly darkened towards lunule; 2 equal ors, 1 ori; third antennal segment small, round, black; mesonotum greyish-black, acr in 4 rows; side of thorax with notopleural area frequently distinctly yellowish, upper margin of mesopleura bright yellow; squamae yellowish-grey, margin and fringe black; wing length 2.0—2.5 mm; male genitalia: aedeagus as in fig. 109; dorsal sclerites sclerotized at base, converging distally, with pair of narrow outer sclerites; distiphallus strongly sclerotized (fig. 110).

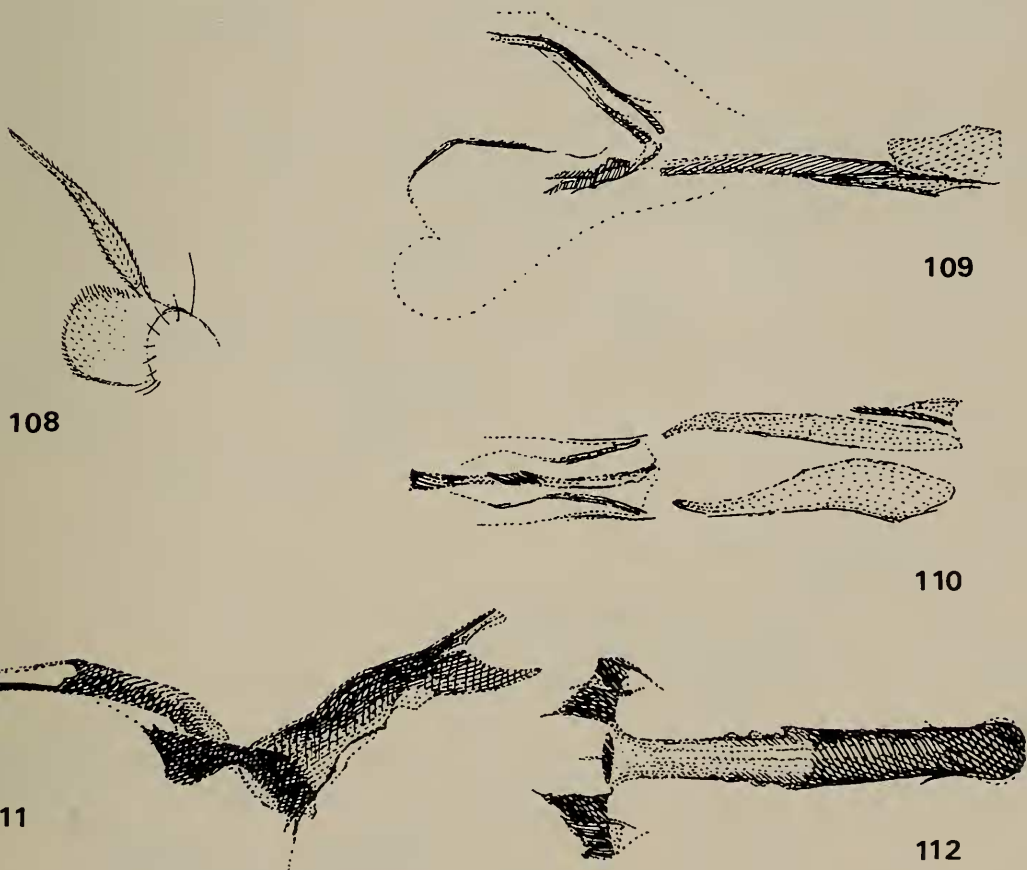


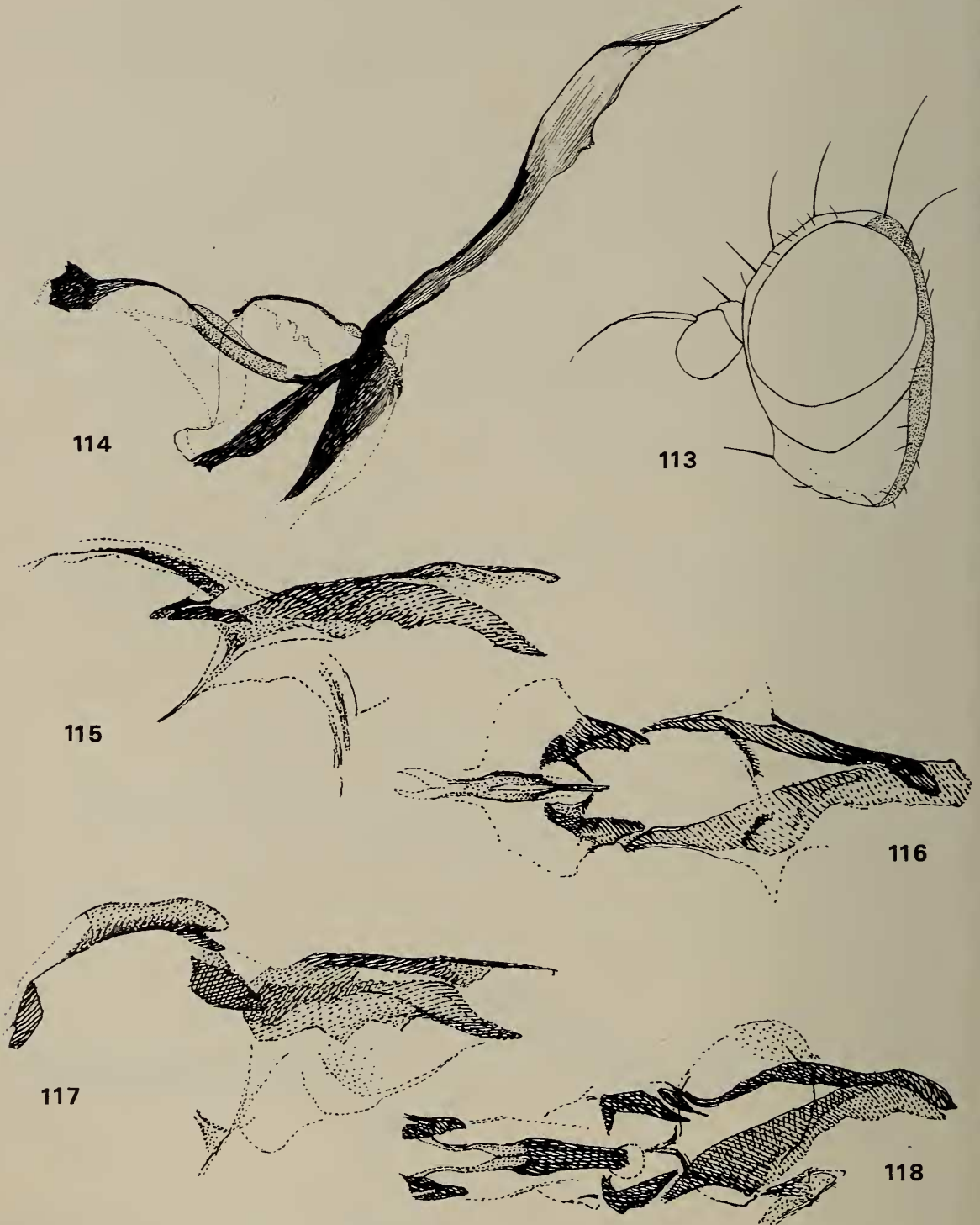
Fig. 108. *Phytomyza crassiseta*, third antennal segment.

Figs. 109, 110. *Chromatomyia platensis*. — 109. aedeagus, side view, — 110. dorsal sclerites (ex *Lycopus europaeus*, Valdivia).

Figs. 111, 112. *Phytomyza enigma*. — 111. aedeagus, side view, — 112. distiphallus, ventral view (holotype, BM).

Hosts. Lamiaceae, reared from *Lycopus* and *Salvia*, also feeding on *Mentha*; larva forming upper surface mine, pupating in mine with anterior spiracles projecting through epidermis.

Distribution. New to Chile, Concepcion, Nonguen 2 ♀♀, on *Mentha arvensis*, 8. I. 78 (K.A.S.); Curico, El Coigual, 1 ♀, 20—26. I. 64; Estero La Jaula, *Nothofagus*, 1 ♀, I. 64 (both L. PEÑA), Elqui, 30 km E. of La Serena, 1 ♀, 3. XII. 50 (ROSS & MICHELbacher), Limarí, Recoleta, 1 ♀, 19. I. 78 (K.A.S.); Valdivia, Valdivia, 1 ♂, 1 ♀, emerged 20. and 21. I. 78 from mines on *Lycopus europaeus* coll. 12. I. 78 (K.A.S.).



Figs. 113, 114. *Phytomyza melanogaster*. — 113. head, — 114. aedeagus.  
 Figs. 115, 116. *Phytomyza cameronensis*, aedeagus. — 115. side view, — 116. ventral view.  
 Figs. 117, 118. *Phytomyza meridialis*, aedeagus. — 117. side view, — 118. ventral view.

References. SPENCER (1963: 383); GRIFFITHS (1974: 35).

Note. The form of the male genitalia and the pupation internally in the leaf indicate this species correctly belongs in *Chromatomyia* (cf. GRIFFITHS 1974).

- Femora with all knees distinctly yellowish . . . . . **enigma** Malloch  
 Synopsis. Frons yellow, slightly darker behind; upper orbits darkened; 2 ors, 1 ori; jowls and face bright yellow; palps black; mesonotum mat grey, acr in 2 rows; wing length 2.3—2.5 mm, second costal section twice length of fourth; male genitalia: aedeagus as in figs. 111, 112 (holotype).  
 Host. Unknown.  
 Distribution. Chiloe, Llanquihue; new records: Santiago, Quebrada de la Plata, 550 m, 33° 30'S, 70° 55'W, near Maipú, 1 ♀, 12. III. 66, Malaise (M. E. IRWIN); Argentina; new record: Rio Negro Prov., 11.4 km E. of Llao Llao, 760 m, 4 ♂♂, 2 ♀♀, 16. XI. 66 (E. I. SCHLINGER & M. E. IRWIN).  
 Reference. MALLOCH (1934: 485).
- 4 Knees bright yellow; large species, wing length 3.5—3.7 mm **melanogaster** Thomson  
 Synopsis. Head (fig. 113) with jowls broad; frons, jowls and face bright yellow; 2 ors, 2 ori; first and second segments yellowish, third round, black; palps black; acr sparse in 3 or 4 rows; side of thorax largely dark but upper margin of mesopleura narrowly bright yellow; wing with second costal section long, 3 times length of fourth; male genitalia: aedeagus as in fig. 114.  
 Host. Unknown.  
 Distribution. Magallanes, Port Famine, 50 km south of Punta Arenas; new record: Magallanes, Tierra del Fuego, Cameron, 1 ♀, 17. XI. 60 (L. PEÑA).  
 Reference. SPENCER (1963: 382).  
 Note. The type specimens collected during the voyage of the Swedish frigate "Eugenie", are labelled "Patagonia" but PERSSON (1971: 168) has located the collecting areas during the stop of the frigate in Patagonia at Port Famine as Mt. Tarn and York Bay.
- Knees dark or at most slightly yellowish; smaller species, wing length 2.6—3.0 mm 5  
 5 Frons uniformly bright yellow . . . . . **cameronensis** sp. n.  
 Synopsis. See description, p. 53; male genitalia: aedeagus as in figs. 115, 116.  
 Host. Unknown.  
 Distribution. Magallanes, Tierra del Fuego.
- Frons orange-yellow in front, darker behind . . . . . **meridialis** sp. n.  
 Synopsis. See description, p. 53; male genitalia: aedeagus as in figs. 117, 118.  
 Host. Unknown.  
 Distribution. Aysen, Magallanes.

## 5. Descriptions of new species of Chilean Agromyzidae

### 5.1. Genus *Melanagromyza* Hendel

#### *Melanagromyza aguilerai* sp. n. (figs. 11, 12, p. 7)

Head. Frons twice width of eye, not projecting above eye in profile; 2 ors, 3 ori, orbital setulae sparse, reclinate; ocellar triangle broad, short, apex extending to level of lower ors; jowls 1/4 height of eye, this bare in male; third antennal segment small, round, arista bare.

Mesonotum. 2 dc, acr in some 8 rows.

Wing. Length in male 2 mm, last section of M 3+4 little more than half penultimate, in ratio 16:28.

Colour. Ocellar triangle and orbits only weakly shining; mesonotum and abdomen moderately shining black, with faint coppery tinge; squamae and fringe white.



Male genitalia. Aedeagus with prominent basal bladder (fig. 11) and distinctive lateral flaps in ventral view (fig. 12); hypandrium pale, triangular.

Material. Holotype ♂, Limarí, Fray Jorge Forest, 21. I. 78 (K.A.S.), in AC.

Note. I have pleasure in naming this species after Prof. A. AGUILERA who accompanied me to the interesting locality where the type specimen was collected.

*Melanagromyza limariensis* sp. n. (fig. 20, 21, p. 9)

Adult. Agreeing closely with *M. vasquezzi* sp. n., differing in the smaller size, with wing length of 2.0 mm in male, 2.3 mm in female, the long shining ocellar triangle and the male genitalia; aedeagus as in figs. 20, 21, with distal tubule short; hypandrium with finely extended apodeme; sperm pump with rounded blade.

Material. Holotype ♂, Limarí, Recoleta, 19. I. 78; paratype ♀, same data (both K.A.S.), in AC.

*Melanagromyza tarapacensis* sp. n. (figs. 7, 8, p. 7)

Head. Frons about  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; orbital bristles strong, 2 ors, 2 ori; orbital setulae numerous, reclinate; jowls deepest in centre below eye, about  $\frac{1}{5}$  height of eye, this large, with conspicuous patch of long pilosity at level of ors; third antennal segment small, round, arista with conspicuous pubescence.

Mesonotum. 2+0 dc, acr numerous, in about 10 rows.

Wing. Length 2.5—2.6 mm, last section of vein M  $3+4 \frac{2}{3}$  length of penultimate.

Colour. Frons mat black, orbits and ocellar triangle moderately shining; mesonotum and abdomen shining green, squamae and fringe silvery, margin only slightly differentiated, yellowish-brown.

Male genitalia. Aedeagus as in figs. 7, 8; sperm pump with broad, pale blade and strong central vein (cf. *M. neotropica*, fig. 19), base strongly developed and extended laterally; hypandrium rather square, with finely extended apodeme.

Material. Holotype ♂, Tarapacá, Arica, grounds of University Museum, on *Ipomoea*, 3. II. 78; paratypes: 5 ♀♀, same data, 1 ♂, 1 ♀ 6. II. 78 (all K.A.S.), in AC.

Remarks. This species is distinctive in the pubescent arista and particularly long pilosity of the eye in the male. The host is possibly *Ipomoea* but this cannot be assumed with certainty.

*Melanagromyza vasquezzi* sp. n. (figs. 22, 23, p. 9)

Head. Frons twice width of eye, not projecting above eye in profile; 2 ors, 2 ori, orbital setulae sparse, reclinate; jowls  $\frac{1}{4}$  height of eye, this bare in both sexes; third antennal segment small, round, arista only finely pubescent.

Mesonotum. 2 dc, acr in some 6 rows.

Wing. Length 2.25 mm in male, last section of vein M  $3+4$  about  $\frac{2}{3}$  penultimate.

Colour. Ocellar triangle weakly shining, black; mesonotum blackish-green, mat viewed from front, distinctly shining from rear; abdomen moderately shining greenish; squamae grey, margin black, fringe dark.

Male genitalia. Aedeagus as in figs. 22, 23, with distal tubule long, ventral bladder scarcely extending behind end of mesophallus complex; hypandrium with extended apodeme; sperm pump large, with broad blade.

Material. Holotype ♂, Limarí, Fray Jorge N.P., 21. I. 78 (K.A.S.); paratype ♂, same data (both K.A.S.); Elqui, 10 miles W. of Vicuña, 3. XII. 50 (ROSS & MICHELbacher). Holotype and paratype in AC, one paratype in CAS.

Remarks. This species closely resembles *M. limariensis* but is distinguishable by the larger size and different male genitalia.

*Melanagromyza verbenae* sp. n. (figs. 9, 10, p. 7)

Head. Frons broad, twice width of eye, not projecting above eye; 2 ors, 3 ori, orbital setulae in several rows, reclinate; ocellar triangle broad, apex extending to level of upper ors; eye bare.

Mesonotum. 2 dc, acr in some 6 rows.

Wing. Length from 1.6 mm in male to 2.1 mm in female, last and penultimate sections of vein M 3+4 approximately equal, inner cross-vein beyond midpoint of discal cell.

Colour. Orbits and ocellar triangle weakly shining, black; mesonotum weakly shining blackish-green, abdomen more distinctly green; squamae and fringe white, margin scarcely darker.

Male genitalia. Aedeagus (figs. 9, 10) exceptionally short; hypandrium approximately triangular, without extended apodeme.

Host. Almost certainly *Verbena litoralis*, adults caught on this plant.

Material. Holotype ♂, Elqui, La Serena, 23. I. 78, on *Verbena litoralis* (K.A.S.); paratypes: 3 ♂♂, 8 ♀♀, same data, in AC.

Remarks. This species can be definitely associated with a male from Florida reared from *Verbena scabra* Duval (which was extracted dead from the puparium), as the genitalia of the two are generally similar but differ in detail. It can thus be assumed with certainty that the host of the series from waste ground at La Serena was *Verbena litoralis* which was growing commonly where the specimens were caught.

*Melanagromyza vicunensis* sp. n. (figs. 15, 16, p. 8)

Head. Frons broad, almost twice width of eye, not projecting above eye in profile; 2 ors, 2 more widely spaced ori; jowls 1/4 height of eye, this in male with conspicuous patch of white pubescence at level of ors; third antennal segment small, round, arista finely pubescent.

Mesonotum. 2 dc, acr in about 8 rows.

Wing. Length from 2.5 mm in male to 2.6 mm in female, last section of M 3+4 little more than length of penultimate.

Colour. Ocellar triangle and orbits only weakly shining; mesonotum blackish-green, mat viewed from front, moderately shining from rear; abdomen shining green or coppery, squamae and fringe white.

Male genitalia. Aedeagus large, weakly pigmented, as in figs. 15, 16; hypandrium pale, triangular.

Material. Holotype ♂, Elqui, Vicuña, 600 m, 18. I. 78; paratypes: 6 ♀♀, same data; Limarí, Recoleta, 1 ♂, 19. I. 78 (all K.A.S.), in AC. A series of 20 females from Santiago, Rincoñada Maipú, 6—20 (Malaise), N. HICHINS & M. E. IRWIN (CAS) possibly represent the same species but are not treated as paratypes in the absence of males.

Remarks. The most distinctive character of this species is the broad frons but among the species with the mesonotum greenish positive identification may only be possible from the male genitalia.

5.2. Genus *Ophiomyia* Braschnikov*Ophiomyia aricella* sp. n. (figs. 27—29, p. 11)

Head (fig. 27). Frons narrow, little wider than eye, not projecting above eye in profile; 2 ors, 2 ori, orbital setulae weak, sparse, reclinate; jowls approximately 1/4 height of eye, forming angle of 45°; vibrissal fasciculus regularly curving, slender at base.

Mesonotum. 2 strong dc, acr in 8 rows.

Wing. Length 1.9 mm in male; last and penultimate sections of M 3+4 equal, outer cross-vein slightly closer than own length to inner.

Colour. Black; ocellar triangle mat, orbits weakly shining; mesonotum greyish-black, only weakly shining; squamae grey, margin and fringe black.

Male genitalia. Aedeagus (figs. 28, 29) characteristically asymmetrical, with distinctively elongated distal tubule.

Host. Possibly *Bidens* on which type series was caught.

Material. Holotype ♂, Tarapacá, Arica, grounds of University Museum, 9. II. 78, on *Bidens* sp. (K.A.S.); paratypes: 2 ♂♂ (one without head), same data (all in AC).

Remarks. This species generally resembles *O. vulgaris* but is distinguishable by the more acute vibrissal angle. The male genitalia indicate that the two species are not closely related.

*Ophiomyia aricensis* sp. n. (figs. 33—35, p. 13)

Head (fig. 33). Frons slightly less than twice width of eye, not projecting above eye in profile; 2 short, stout ors, 2 similar ori, orbital setulae reclinate; ocellar triangle ill-defined but extended as a groove to margin of lunule; jowls narrow, 1/10 height of eye, this large, round; vibrissa short, simple, an irregular group of bristles along vibrissal margin; antennae not divided by raised facial keel; third antennal segment round, arista long, only finely pubescent.

Mesonotum. 2 strong dc, acr numerous, in some 10 rows.

Wing. Length 2.5 mm; last section of M 3+4 approximately 2/3 length of penultimate.

Colour. Black; ocellar triangle and orbits entirely mat; mesonotum distinctly mat, almost greyish-black; squamae whitish-grey, margin and fringe black.

Male genitalia. Aedeagus as in figs. 34, 35, distiphallus symmetrical; basal sclerites continuing beyond area of sclerotization at base as a membranous loop below the distiphallus complex.

Material. Holotype ♂, Tarapacá, Arica, Lluta Valley, 30. I. 78; paratype ♀, same data (both K.A.S.), in AC.

Remarks. Although appearing externally as a *Melanagromyza*, the form of the genitalia indicates the correct generic position of this species in *Ophiomyia*.

*Ophiomyia mallecensis* sp. n. (figs. 24—26, p. 11)

Head (fig. 24). Frons broad, twice width of eye, distinctly projecting above eye in profile; 2 ors, 2 ori, orbital setulae reclinate, strong; jowls exceptionally broad, 1/2 height of eye, produced to form angle of 45°; vibrissal fasciculus short, with a bunch of unfused bristles at base; antennae divided by broad facial keel, with distinct furrow centrally; proboscis somewhat elongate.

Mesonotum. 2 strong dc (additional weak bristle present on one side between 1st and 2nd in unique holotype); acr numerous, in some 10 rows.



Wing. Length in male 2.5 mm, last section of M 3+4 only slightly shorter than penultimate, outer cross-vein own distance from inner.

Colour. Black; ocellar triangle and orbits scarcely shining; mesonotum mat, distinctly greyish; squamae dark grey, margin and fringe black.

Male genitalia. Aedeagus (figs. 25, 26) characteristically asymmetrical, with paired areas of weak sclerotization ventrally below distiphallus.

Material. Holotype ♂, Malleco, Marimenuco, 10.—13. XII. 1959 (L. PEÑA), in CNC.

Remarks. The large size and broad jowls make this a distinctive species, immediately distinguishable on these characters from the others known in Chile.

*Ophiomyia vulgaris* sp. n. (figs. 30—32, p. 13)

Head (fig. 30). Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; 2 ors, 2 ori, orbital setulae minute, sparse, reclinate; jowls between  $\frac{1}{4}$  and  $\frac{1}{3}$  height of eye, forming angle of  $80^\circ$ ; vibrissal fasciculus relatively short, broad at base; antennae divided by narrow facial keel.

Mesonotum. 2 strong dc, acr in 8 rows.

Wing. Length from 1.75 mm in male to 1.90 mm in female; last section of M 3+4 distinctly shorter than penultimate, in ratio 14:17 to 15:20.

Colour. Black; both ocellar triangle and orbits mat, otherwise as in *O. aricella*.

Male genitalia. Aedeagus (figs. 31, 32) characteristically asymmetrical, basal bladder extending to rear of distiphallus complex, and additional appendix-like projection below.

Material. Holotype ♂, Elqui, Alcoguas, 1560 m, 18. I. 78 (K.A.S.); paratypes: 1 ♂, 2 ♀♀, same data; Vicuña, 600 m, 30. XI. 77 (H. VASQUEZ); Santiago, Rincoñada Maipú, 450 m,  $33^\circ 31'S$ ,  $70^\circ 47'W$ , 1 ♂, 4 ♀♀, 30. III. 66 (N. HICHINS & M. E. IRWIN). Holotype and paratype in AC, further paratypes in CAS and UNA.

Remarks. This species generally resembles *O. arguta* Spencer from the Bahamas (SPENCER & STEGMAIER 1973: figs. 417—419) but slight differences in the genitalia suggest that the two species are distinct. It is distinguishable from *O. aricella* by the less acute vibrissal angle (fig. 30); the male genitalia of the two species are entirely distinct.

### 5.3. Genus *Cerodontha* Rondani

*Cerodontha (Cerodontha) chilensis* sp. n. (figs. 41, 42, p. 16)

Head. Frons narrow, little wider than eye, only narrowly projecting above eye; 1 strong reclinate ors near centre of frons, close below one substantially weaker, largely proclinate ori; orbital setulae numerous, below ori proclinate; third antennal segment angular or with more distinct blunt projection at upper corner, thickly covered with white pubescence (cf. fig. 43).

Mesonotum. 3+1 strong dc, acr sparse, in 2 rows.

Wing. Length from 2.8 mm in male to 3.2 mm in female, last and penultimate sections of vein M 3+4 approximately equal.

Colour. Frons, jowls and face bright yellow; orbits yellow below but darkened above ors, hind-margin of eye black, normally to base of vti; third antennal segment black, first and second only slightly paler; mesonotum and scutellum mat grey; rear of humerus, notopleura and upper third of mesopleura bright yellow, yellow frequently descending down hind-margin; legs black but all femora bright yellow at knees for almost twice width of femoral diameter; wing base and squamae bright yellow but margin dark.

Male genitalia. Aedeagus (figs. 41, 42) exceptionally long, distinctly enlarged distally, fully fused at apex but then narrowly divided behind; cerci with numerous strong bristles along inner margin.

Material. Holotype ♂, Santiago, Rincoñada Maipú, 450 m, 31. V. 66 (Malaise) (N. HICHINS & M. E. IRWIN); paratypes: 1 ♂, 25. V., 2 ♀♀, 18. V., 1 ♂, 9. III, 1 ♀, 12. III. 66, otherwise same data. Holotype and paratypes in CAS, 2 paratypes in AC.

Remarks. This species closely resembles *C. magellani* but is larger and with both mesonotum and femora more yellow. The male genitalia clearly indicate the close relationship of the two species.

*Cerodontha (Cerodontha) magellani* sp. n. (figs. 43, 44, p. 16)

Adult. Closely resembling *C. chilensis*, differing in the less yellow upper margin of the mesopleura, more narrowly yellow knees of the femora and smaller size, with wing length of 2.4 mm; third antennal segment (fig. 43) angular or with blunt projection at upper corner, thickly covered with white pubescence.

Male genitalia. Aedeagus pale, scarcely sclerotized, not greatly enlarged at end, fused at tip but narrowly divided below, very long (fig. 44, same scale as *C. patagonica*, fig. 40); cerci with numerous strong bristles along inner margin.

Material. Holotype ♂, Magallanes, 4 km W. of Laguna Amarga, 50° 59' S., 72° 45' W, 12. VII. 66 (M. E. IRWIN, E. I. SCHLINGER); paratypes: 1 ♂, same data; 1 ♀, Tierra del Fuego, 20 km S. of Percy, 12. XI. 60 (PEÑA). Holotype and paratype in CAS, one paratype in CNC.

Remarks. A specimen (presumably male) from Curico, Estero La Jaula, *Nothofagus*, I. 64 (L. PEÑA, CNC) is tentatively referred to this species but the notopleura are entirely dark. The genitalia were previously examined by another worker and a microvial is present on the mount but this contains only abdominal membrane. Confirmation of the status of this specimen will only be possible when a further male becomes available from Curico which can be associated with it.

*Cerodontha (Cerodontha) patagonica* sp. n. (fig. 40, p. 15)

Head. Orbits with 2 equal ors and 1 strongly inclined ori, strongly projecting above eye in profile; orbital setulae sparse, only below ori, reclinate or inclined; jowls extended at rear, approximately 1/3 height of eye, cheeks forming broad ring below eye; third antennal segment elongate, with a short spine at upper corner.

Mesonotum. Acr in 2 rows.

Wing. Length in male 2.4 mm; last and penultimate sections of vein M 3+4 equal.

Colour. Frons and lunule yellow; mesonotum and scutellum uniformly mat grey; notopleura and rear of humerus bright yellow; legs: coxae black, femora appearing black from above, with knees yellowish for femoral diameter, but more yellowish below; tibiae and tarsi dark blackish; abdomen entirely black.

Male genitalia. Aedeagus strongly sclerotized, as in fig. 40; distiphallus conspicuously enlarged at end, fused at tip.

Material. Holotype ♂, Magallanes, Tierra del Fuego, 11.8 km NW of Russfin, 300 m, dry *Nothofagus* forest, 12. I. 66 (M. E. IRWIN, E. I. SCHLINGER), in CAS.

Remarks. This species closely resembles *C. flavifrons* and is also closely related to it. However, the legs are dark (both coxae and femora bright yellow in *C. flavifrons*) and the differing curvature of the aedeagus appears to be significant (contrast fig. 39).

*Cerodontha (Butomyza) chilena* sp. n. (fig. 45, p. 16)

Head. Frons (including orbits) broad, 3 times width of eye, not projecting above eye in profile; 2 equal reclinate ors, 2 equal inclined ori; orbital setulae sparse, reclinate; orbits broad, each approximately half width of frons between their inner margin, slightly widening towards base of antennae; lunule higher than a semicircle, upper margin at level of upper ors; jowls angular, extended at rear, there in ratio 7:18 with eye height; third antennal segment small, round.

Mesonotum. 3 + 1 strong dc, presutural equal to 3rd; acr apparently sparse, in 4 rows (mesonotum deformed during mounting).

Wing. Length from 2.1 mm in male to 2.3 mm in female, last and penultimate sections of vein M 3+4 equal or last slightly longer.

Colour. Frons and jowls blackish, orbits similar but narrowly paler along inner margin; all antennal segments black; mesonotum and scutellum mat blackish-grey, with only weakest subshine; pleura uniformly black; legs largely black, only fore-femora narrowly and faintly yellowish at knees; squamae pale grey, margin and fringe black.

Male genitalia. Aedeagus as in fig. 45, distal tubules not diverging; sidearms of hypandrium broadly fused at apex; sperm pump with narrow stalk and broad blade; hind-corner of epandrium with a group of short bristles and longer hairs.

Material. Holotype ♂, Magallanes, Lago Amarga, Natales, E. of Mt. Payne, 200 m, 14.—20. XII. 60; paratype ♀, Tierra del Fuego, 60 km N. of Punta Arenas, 10. XII. 60 (both L. PEÑA), in CNC.

Remarks. This is the second species in this subgenus now known in South America, although many more certainly await discovery. Three species were recorded in California (SPENCER 1981) and eight are now known in North America. *C. chilena* generally resembles *C. (But.) nitidiventris* (MALLOCH 1934), **comb. nov.** described from Bariloche, Lago Nahuel Huapi, Argentina but is larger and the frons is broader.

5.4. Genus *Liriomyza* Mik*Liriomyza cekalovici* sp. n. (figs. 58, 59, p. 22)

Head. Frons  $1\frac{1}{2}$  times width of eye, narrowly projecting above eye towards base of antennae; 2 stout ors, 2 smaller ori; orbital setulae sparse, reclinate; jowls extended at rear,  $\frac{1}{3}$  height of eye, this slanting; third antennal segment round, finely pubescent.

Mesonotum. 2+1 dc, presutural strong, little weaker than 2nd; acr in 4 rows; intra-alar lacking.

Wing. Length in male 2.1 mm; discal cell large, last section of M 3+4 only slightly more than  $1\frac{1}{2}$  times length of penultimate.

Colour. Frons, jowls and face yellowish-orange; hind-margin of eye and orbits to upper ori black; third antennal segment dark, blackish-brown, more yellowish on inside, first and second segments yellow; palps largely yellow but narrowly blackish on outside; mesonotum deep black, moderately shining; scutellum bright yellow centrally, black at sides; mesopleura divided diagonally, black along front and lower margins, yellow above and behind, sternopleura largely black, only narrowly yellow along upper margin; legs: all coxae black, femora appearing black, with knees narrowly yellow, but distinctly yellowish below, tibiae and tarsi black; squamae pale grey, margin and fringe black.

Male genitalia. Aedeagus as in figs. 58, 59, ventral sclerite strongly developed, almost circular, with an additional black sclerite centrally; sperm pump large, with



blade narrow at base, then uniformly widening, base strongly developed, with strong lateral extensions; surstyli discrete, with one strong spine and 2 shorter ones basally.

Material. Holotype ♂, Concepcion, Concepcion, 22. XI. 69 (CEKALOVIC), in BM.

Remarks. The presence of only 2+1 dc associate this species with *L. chilensis* and the close relationship is confirmed by the male genitalia (cf. figs. 56, 57). With the limited material seen, it appears that this new species is distinctly smaller than *L. chilensis* which is relatively large for this genus, with wing length of 2.60—2.75 mm.

*Liriomyza cestri* sp. n. (figs. 64—66, p. 23)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; 2 reclinate ors, 2 inclined ori; orbital setulae sparse, reclinate; jowls extended at rear, about  $\frac{1}{3}$  height of eye; third antennal segment small, round.

Mesonotum. 3+1 dc, acr in 4 rows, no intra-alar.

Wing. Length from 1.6 mm in male to 2.0 mm in female; discal cell small, last section of M 3+4 3 times penultimate.

Colour. Frons and jowls bright yellow; hind-margin of eye and orbits deep black; third antennal segment variably darkened, from largely brown to faintly brownish on upper half, yellow below, first and second segments yellow; palps yellowish but normally somewhat darkened; legs: coxae yellow on fore-legs, black on mid- and hind-legs; femora bright yellow but slightly darkened at base, occasionally with faint darker striations on hind-legs; tibiae and tarsi brown; mesonotum shining black, with distinct but small yellow patches at rear corners; scutellum bright yellow, narrowly black at sides; mesopleura largely black, narrowly yellow along upper margin; squamae grey, margin and fringe black; halteres bright yellow.

Male genitalia. Aedeagus as in figs. 64, 65; sperm pump with large blade but intermediate between the narrow blade of *L. sativae* and the very wide blade of *L. elquensis* (fig. 69).

Host. *Cestrum parqui*, larva forming a linear mine (fig. 66), pupating externally; (larvae not known).

Material. Holotype ♂, Quillota, La Cruz, 5. I. 78, on *Cestrum*; paratypes: 12 ♂♂, same data; Elqui, Alcoguas, 1560 m, 1 ♂, 18. I. 78 (all K.A.S.); Santiago, Rincoñada Maipú, 7 ♂♂, 16.—19. III. 66; 19 ♂♂, 25. III.—1. VI. 66, Malaise (N. HICHINS & M. E. IRWIN); 1 ♂, X. 1968 (N. HICHINS), El Canelo, 1 ♀, 9. I. 77 (M. E. IRWIN). Holotype and paratypes in AC, further paratypes in BM, CAS and UChS. Empty leaf mines found at Santiago, El Canelo, 3. I. 78.

Remarks. The male genitalia closely associate this species with *L. baccharidis* Spencer 1963 which feeds on a number of genera of Asteraceae (cf. SPENCER 1981), *L. brassicae* (Riley) which feeds exclusively on Brassicaceae and an undescribed species from Argentina reared from *Caesalpinia gillesii* (Fabaceae) (coll. VALLADARES). Among Chilean species *L. cestri* is distinguishable by the faintly brownish third antennal segment and the bright yellow femora.

*Liriomyza concepcionensis* sp. n. (figs. 60, 61, p. 22)

Head (Now missing). Frons yellow, orbit slightly darkened; third antennal segment uniformly dark brown, first and second paler.

Thorax. Mesonotum deep black, only moderately shining; 3+1 strong dc, acr in 4 rows, intra-alar present; rear of humerus and notopleural area bright yellow, mesopleural area entirely black, apart from being narrowly yellow at upper hind-corner; scutellum bright yellow centrally; legs: femora appearing blackish above, with yellow knees, but distinctly yellow below; tibiae and tarsi brownish-black; squamae dark grey, margin and fringe black.

Male genitalia. Aedeagus (figs. 60, 61) divided at apex, with symmetrical membranous extensions; sperm pump with short, narrow stalk and greatly widening rounded blade; surstyli with single, rather long spine at end.

Material. Holotype ♂, Concepcion, Halpen, 8. I. 78 (K.A.S.), in AC.

Remark. Although this species most closely resembles *L. cortesi*, the male genitalia show that the two are not closely related.

*Liriomyza cortesi* sp. n. (figs. 62, 63, p. 22)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye; 2 ors, 2 ori, orbital setulae sparse, reclinate; jowls  $\frac{1}{3}$  height of eye; third antennal segment small, round.

Mesonotum. 3+1 strong dc, acr in 4 rows, intra-alar present.

Wing. Length 2.3 mm, discal cell large, last section of vein M 3+4 about twice length of penultimate.

Colour. Frons, jowls and face bright yellow; orbits black, with both vt on black; third antennal segment dark brown above, somewhat yellowish below; first and second segments yellow; mesonotum deep black, strongly shining; humerus, notopleural triangle and upper margin of mesopleura bright yellow, pleura otherwise black; legs deep black but all knees contrasting yellow; squamae yellowish, margin and fringe dark.

Male genitalia. Aedeagus ending in paired, largely fused tubules (figs. 62, 63); sperm pump black, strongly pigmented, large, base extended at each side.

Material. Holotype ♂, Tarapacá, Socorona, 2900 m, in stream bed below village, 7. II. 78; paratype ♀, same data (K.A.S.), in AC.

Remarks. The darkened third antennal segment and black femora make this a distinctive species. The male genitalia do not indicate close relationship with any other species known in Chile.

*Liriomyza elquensis* sp. n. (figs. 67—69, p. 23)

Head. Frons broad, twice width of eye, not projecting above eye in profile; 2 ors, 2 ori; orbital setulae sparse, reclinate; jowls  $\frac{1}{3}$  height of eye; third antennal segment small, round.

Mesonotum. 3+1 strong dc, acr in 4 rows; no intra-alar.

Wing. Length in male 1.6 mm; discal cell small, last section of M 3+4 3 times length of penultimate.

Colour. Frons bright yellow; hind-margin of eye black to base of vti, upper orbits black to upper ori; jowls and palps yellow; third antennal segment brownish on upper third below arista, otherwise yellow, first and second segments yellow; mesonotum deep black, shining, hind-corners only narrowly yellow; scutellum largely bright yellow, only narrowly black at sides; rear of humerus and notopleural triangle bright yellow; mesopleura largely black, narrowly yellow along upper margin; legs: femora basically yellow but with variable brownish striations; tibiae and tarsi black; squamae grey, margin and fringe black.

Male genitalia. Aedeagus as in figs. 67, 68; sperm pump (fig. 69) with exceptionally broad blade.

Material. Holotype ♂, Elqui, Alcoguas, 1560 m, 18. II. 78 (K.A.S.), in AC.

Remarks. This species closely resembles *L. sativae* apart from the darkened third antennal segment. The male genitalia are distinctive.

*Liriomyza lolii* sp. n. (fig. 51, p. 21)

Head. Frons broad, twice width of eye, not projecting above eye in profile; 2 ors, 1 ori, rarely a short setula below; orbital setulae sparse, reclinate; jowls angular, extended at rear, 1/3 height of eye, this slanting; third antennal segment small, round.

Mesonotum. 3+1 strong dc, acr in 4 rows, no intra-alar.

Wing. Length 1.7 mm, discal cell small, last section of vein M 3+4  $2\frac{1}{2}$  times length of penultimate.

Colour. Frons bright yellow, orbits darkened to ori, both vt on black ground; jowls yellow, first and second antennal segments yellowish, third black; mesonotum deep black, shining, almost brilliantly so; scutellum dull black, with trace of faint yellow undertone; humerus and notopleural area and wing base bright yellow; mesopleura largely black but upper- and hind- margins yellow; legs black but all knees bright yellow; squamae and fringe yellow.

Male genitalia. Aedeagus as in fig. 51, sperm pump with slender stalk and almost round blade; surstyli slender, with single spine at end.

Material. Holotype ♂, Osorno, grounds of INIA, Osorno, 30 km E. of Osorno, emerged ex mine on *Lolium perenne*, 26. I. 78, coll. 13. I. 78; paratypes: 3 ♀♀, same data (K.A.S.), in AC.

Further caught specimens, not treated as paratypes, have been seen probably representing this species from:

Arauco: Carampangue, 22 specimens, 22. I. 78 (L. CEKALOVIC).

Cautin: Temuco, Vulcan Llaima, 1 ♀, 10. I. 78 (K.A.S.).

Chiloe: Ancud, 1 ♀, 12. II. 66 (R. H. GONZALEZ).

Concepcion: Petrohue, 1 ♀, 8. I. 78 (K.A.S.).

Limari: Recoleta, 1 ♂, 19. I. 78 (K.A.S.).

Valdivia: Valdivia, 1 ♀ (damaged subsequently by ants), 12. I. 78 (K.A.S.).

Remarks. The only significant difference in the male genitalia between this species and *L. peullae* is in the sperm pump which is here substantially smaller. Intermediate colour forms are unusual but appear to be identifiable by the colour of the squamal fringe, which is consistently pale in *L. lolii* and dark in *L. peullae*.

*Liriomyza navarinensis* sp. n. (figs. 80, 81, p. 26)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; 2 ors, 2 strong ori, orbital setulae sparse, reclinate; gena extended at rear, 1/3 height of eye; third antennal segment small, round.

Mesonotum. 3+1 strong dc, acr irregular, in 4 rows, no intra-alar.

Wing. Length in male 3 mm; discal cell large, last section of M 3+4  $1\frac{1}{2}$  times length of penultimate.

Colour. Frons, orbits, gena, all antennal segments yellow; hind-margin of eye black to base of vti; mesonotum mat, greyish, scutellum almost entirely bright yellow; side of thorax bright yellow but mesopleura black on lower three-quarters; legs largely dark, femora black, with all knees bright yellow, tibiae and tarsi virtually black, squamae yellowish-grey, margin and fringe black.

Male genitalia. Aedeagus as in figs. 80, 81; sperm pump with rounded blade, short stalk and strongly pigmented base; surstyli narrow, with a single long, hair-like bristle.

Material. Holotype ♂, Magallanes, Tierra del Fuego, Puerto Williams, Isla Navarino, 22.—29. XI. 60 (PEÑA), in CNC.

Remarks. This is the largest grass-feeding *Liriomyza* known in Chile, the male genitalia clearly indicating that the host is in the Poaceae.



*Liriomyza patagoniensis* sp. n. (figs. 53, 54, p. 21)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; 2 ors, 2 ori; orbital setulae sparse, reclinate; orbits broad, widening towards base of antennae; jowls angular, extended at rear,  $\frac{1}{3}$  height of eye; third antennal segment small, round.

Mesonotum. 3+1 strong dc, acr sparse, in 2 rows, intra-alar present.

Wing. Length from 1.75 mm in male to 2.10 mm in female; discal cell relatively large, last section of vein M 3+4 little over twice length of penultimate.

Colour. Frons mat black, orbits somewhat paler; jowls brownish-black, all antennal segments black; mesonotum and scutellum uniformly mat grey; pleura largely blackish, only notopleural area ochrous yellow; legs uniformly black, fore-knees at most narrowly and indistinctly yellowish; squamae grey, margin and fringe black; abdomen uniformly black.

Male genitalia. Aedeagus as in figs. 53, 54; sperm pump with greatly enlarged blade; epandrium with single weak spine at hind-corner, a short, strong spine at midpoint on inner margin; surstyli discrete, elongate, with only weak spine at end.

Material. Holotype ♂, Magallanes, Tierra del Fuego, Estacion Cameron, S. E. of Bahia Inutil, 4.—6. XII. 60 (PEÑA); paratypes: 7 ♂♂, 8 ♀♀, same data. Holotype and paratypes in CNC, 5 paratypes in AC.

Remarks. The uniformly grey mesonotum and scutellum are distinctive. Its relationship is not apparent, even from the male genitalia.

*Liriomyza penella* sp. n. (figs. 82—84, p. 26)

Head. Frons narrow, little wider than eye, not projecting above eye in profile; 2 ors, 2 equal ori; orbital setulae sparse, reclinate; jowls  $\frac{1}{3}$  height of eye, this distinctly slanting; third antennal segment small, round.

Mesonotum. 3+1 dc, acr sparse, in 2 rows, no intra-alar.

Wing. Length in male 1.75 mm, discal cell small, last section of vein M 3+4 3 times length of penultimate.

Colour. Frons, jowls, face, all antennal segments and palps yellow; orbits black to lower ors, both vertical bristles on dark ground; mesonotum mat blackish; humerus, notopleural area and upper margin of mesopleura bright yellow, side of thorax shining black; scutellum yellow centrally; legs largely black but femora with all knees yellow and also somewhat yellow on underside; squamae yellowish-grey, margin and fringe dark.

Male genitalia. Aedeagus as in figs. 82, 83; sperm pump (fig. 84) black, blade divided (possibly abnormal?), base strongly developed; surstyli small, slender, not divided from epandrium.

Material. Holotype ♂, Magallanes, Tierra del Fuego, 20 km S. of Percy, 12. XI. 60 (PEÑA), in CNC.

Remarks. With both the third antennal segment and scutellum yellow this is a typical *Liriomyza* and the male genitalia indicate that it is a grass-feeder.

*Liriomyza subinsignis* sp. n. (fig. 49, p. 18)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; 2 ors, 2 ori, orbital setulae sparse, reclinate; jowls  $\frac{1}{4}$  height of eye, this large, only slightly slanting; third antennal segment small, round, arista long, only finely pubescent.

Mesonotum. 3+1 dc, acr in 4 rows, no intra-alar.

Wing. Length 2.4 mm in female; discal cell small, last section of M 3+4 slightly less than 3 times length of penultimate.

Abdomen. Ovipositor sheath exceptionally long, equal in length to all preceding segments.

Colour. Entirely lemon-yellow, including hind-margin of eye; mesonotum deep black, strongly shining but yellow adjoining scutellum (fig. 49), inner post-alar yellow; side of thorax largely bright yellow with only small black patch on lower margin of mesopleura and sternopleura black on lower three-quarters; legs bright yellow; squamae yellow, margin and fringe black.

Material. Holotype ♀, Tarapacá, Arica, University Museum, 9. II. 78 (K.A.S.), in AC.

Remarks. Distinctive features of this species are the colouration of the mesonotum and the long female ovipositor; in this last character it resembles *L. insignis* Spencer, known from Brazil and Costa Rica but this has the central black area of the mesonotum not extending so far towards the scutellum.

*Liriomyza tumbrensis* sp. n. (figs. 72—74, p. 24)

Head. Frons broad, twice width of eye, distinctly projecting above eye in profile; 2 ors, 2 ori, orbital setulae in single row, reclinate; eye small, distinctly slanting; jowls broad, 1/2 height of eye; third antennal segment round, slightly longer than broad.

Mesonotum. 3+1 dc, acr irregularly in 4 rows, no intra-alar.

Wing. Length from 2.0 mm in male to 2.3 mm in female; discal cell relatively large, last section of vein M 3+4 twice length of penultimate.

Colour. Frons, orbits, entire hind-margin of eye, face and palps yellow; third antennal segment yellowish-orange but brownish on outside or along distal margin; first and second segments yellow; mesonotum mat grey, almost silvery, with a prominent yellow patch at hind-corners; scutellum predominantly yellow, only narrowly black laterally; side of thorax largely yellow, mesopleura with variable dark bar along lower margin; legs: coxae and femora bright yellow, tibiae and tarsi darker, brownish; abdomen with tergites narrowly blackish-grey centrally but broadly yellow on hind-margin and laterally; squamae yellow, margin and fringe dark.

Male genitalia. Aedeagus as in figs. 72, 73, with discrete sclerite behind distiphallus, basal sclerites strongly developed, basal bladder large; sperm pump with narrow stalk, blade straight-sided, asymmetrically triangular; surstylus long, narrow, discrete, with single spine at end, hind-corner of epandrium strongly sclerotized in addition to normal spine (fig. 74).

Material. Holotype ♂, Antofagasta, Tumbre, E. of Atacama Salt Lake, 3600—3800 m, 6.—9. XII. 65 (PEÑA); paratypes: 3 ♂♂, 10 ♀♀, same data. Holotype and paratypes in CNC, 4 paratypes in AC.

Remarks. The male genitalia show that this species is closely related to *L. huidobrensis*, the aedeagus of the two differing only in minor details. However, the pale colour of *L. tumbrensis* is distinctive.

*Liriomyza vicunella* sp. n. (figs. 76, 77, p. 24)

Head. Frons broad, about twice width of eye, narrowly projecting above eye in profile; normally 2 ors and 2 ori, occasionally 3 ori; orbital setulae minute, sparse, reclinate; jowls extended at rear, 1/3 height of eye; third antennal segment (fig. 76) bluntly angulate at upper corner.

Mesonotum. 3+1 strong dc, acr in 4 rows, no intra-alar.

Wing. Length from 1.7 mm in male to 2.5 mm in female; discal cell normally large, with last section of vein M 3+4 from slightly less than twice to 2½ times length of penultimate.

Colour. Frons, jowls, face, all antennal segments and palps yellow, sometimes tending towards orange; hind-margin of eye and at least upper orbits black; mesonotum deep black, moderately shining; scutellum bright yellow centrally, narrowly black at sides; humerus and notopleural triangle bright yellow, mesopleura largely black but broadly yellow along upper margin; legs: femora bright yellow, narrowly black basally, occasionally with irregular brownish striations, tibiae and tarsi black; abdomen largely black, at most front tergites narrowly yellow laterally; squamae yellowish-grey, margin and fringe black.

Male genitalia. Aedeagus as in fig. 77, characteristic of grass-feeders; sperm pump with narrow, heavily pigmented blade and wide base.

Material. Holotype ♂, Elqui, Vicuña, 450 m, 18. I. 78; paratypes: 2 ♂♂, 2 ♀♀, same data; Alcoguas, 1560 m, 2 ♀♀, 18. I. 78 (all K.A.S.); Vicuña, 1 ♀, 20. X. 77; Pan Azucar, 1 ♂, 1 ♀, 15. X. 77 (all H. VASQUEZ); Peru, Camacani, 3700 m, 1 ♀, 22. X. 55 (L. PEÑA). Holotype and paratypes in AC, paratypes in UNA and CAS.

Remarks. With the angulate third antennal segment this species can only be compared with *L. cruciata* but apart from the presence of the outer cross-vein it is larger and the mesonotum deeper black. It was interesting to discover that both species are present at Vicuña.

### 5.5. Genus *Galiomyza* Spencer

#### *Galiomyza australis* sp. n. (figs. 88—90, p. 29)

Head. Frons  $1\frac{1}{2}$  times width of eye, appearing rough, covered with distinct spinules; 2 ors, 2 ori (an additional third below in paratype); orbital setulae sparse, reclinate; jowls slightly less than  $\frac{1}{3}$  height of eye, this round, upright, bare; third antennal segment small, round.

Mesonotum. 3+1 dc, acr in 4 rows in front, 2 rows behind and these inclined; intra-alar equal in length to inner post-alar.

Wing. Length in male 1.6 mm; discal cell relatively large, last section of M 3+4 only twice length of penultimate.

Colour. Frons blackish-brown, orbits uniformly black; third antennal segment bright yellow, first and second black; jowls, face and palps black; mesonotum and scutellum deep black, moderately shining; side of thorax predominantly black but notopleural triangle with faint ochrous undertone (not detectable in paratype) and upper margin of mesopleura narrowly yellowish-ochrous; legs entirely black; squamae grey, margin and fringe black; wing slightly darkened by minute microtrichiae.

Male genitalia. Aedeagus as in figs. 88, 89; epandrium with 2 short, strong spines at hind-corner (1 in paratype) and 1 or 2 similar spines on inner side (fig. 90); surstyli undifferentiated; sperm pump large, longer than aedeagus, stalk narrow, blade then conspicuously widening.

Material. Holotype ♂, Chile, Curico, Fundo la Montana, Estero la Palma at Rio Teno, 6 km E. of Los Quenes, 4. I. 67, Malaise trap (M. E. IRWIN); paratype ♂, Argentina, Rio Negro, 3.7 km S. of Puerto Moreno, 800 m, 17. XI. 66, Malaise trap (E. I. SCHLINGER & M. E. IRWIN), both in CAS.

Remarks. Externally this species is scarcely differentiated from *G. flaviantennata* (SPENCER 1966) from São Paulo, Brazil. However, the male genitalia of the two are distinctively different (cf. SPENCER 1966: figs. 13—15).



5.6. Genus *Calycomyza* Hendel*Calycomyza chilena* sp. n. (figs. 93, 94, p. 29)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye in profile; 2 reclinate ors, normally 3 inclined ori, rarely a small third below; orbital setulae sparse, reclinate; jowls extended at rear,  $\frac{1}{4}$  height of eye; third antennal segment small, round.

Mesonotum. 3 post-sutural dc, acr in 4 rows.

Wing. Length 1.6—2.1 mm in male, 2.25 mm—2.50 mm in female, last section of vein M 3+4  $2\frac{1}{2}$  times length of penultimate.

Colour. Frons orange-yellow or paler yellow, orbits conspicuously black; all antennal segments and face black; mesonotum deep black, moderately shining; notopleura bright yellow, upper margin of mesopleura only narrowly yellow; legs normally entirely black, knees on fore-leg sometimes narrowly yellow; squamae and fringe pale, whitish-yellow.

Male genitalia. Aedeagus (figs. 93, 94) with distal processes conspicuously angulate, mesophallus slender, not greatly widening basally; front ventral lobes strongly developed, rear ones fused, basal sclerites appearing discrete, with membranous connection centrally; sperm pump with short stalk and broad blade.

Material. Holotype ♂, Elqui, Vicuña, 600 m, 18. I. 78; paratypes: 2 ♀♀, same data (K.A.S.); Los Vilos, 1 ♀, 25. IX. 66 (E. I. SCHLINGER); 2 ♂♂, 5 ♀♀, 20. X.—30. XI. 77; Marquesa, 1 ♀, 14. XII. 77 (all H. VASQUEZ, Malaise); Santiago, Rincoñada Maipú, 450 m, 33° 31'S, 70° 47'W, 14. V. 66 (Malaise); 2 ♀♀, 23. III. and 15. IV., otherwise same data (all N. HICHINS, M. E. IRWIN); 1 ♂, 1 ♀, X. 68; 2 ♂♂, 1 ♀, X. 68; 2 ♂♂, 1 ♀, XI. 68 (all N. HICHINS, Malaise); El Canelo, 33° 35'S, 70° 27'W, 3 ♂♂, 1 ♀, 1. IX. 66 (M. E. IRWIN). Holotype and paratypes in AC, further paratypes in CAS, UChS and UNA.

Remarks. *C. chilena* closely resembles both *C. platyptera* (Thomson) which is common in California and Florida on many genera of Asteraceae and *C. menthae* Spencer, a leaf-miner on Lamiaceae also known only in U.S.A. However, it is somewhat larger, the orbits are more black and there are small differences in the male genitalia. Differences in the genitalia can be slight in this group of species which are certainly distinct, such as *C. platyptera* and *C. menthae*, feeding on unrelated hosts. *C. chilena* appears to be widespread and not uncommon in central Chile and with further collecting its host should be discovered without difficulty.

5.7. Genus *Phytoliriomyza* Hendel*Phytoliriomyza aysensis* sp. n. (fig. 96, p. 32)

Head (fig. 96). Frons broad, twice width of eye, not projecting above eye in profile; 2 equal, reclinate ors, 1 inclined ori, orbital setulae sparse, proclinate; eye large, round, only slightly slanting, jowls relatively narrow,  $\frac{1}{4}$  height of eye; third antennal segment small, rounded, only slightly longer than broad, arista only slightly pubescent.

Mesonotum. 3+1 dc, acr irregular, in 2 or 3 rows.

Wing. Length in female 2.5 mm; discal cell large, last section of vein M 3+4  $1\frac{1}{2}$  times length of penultimate.

Colour. Frons yellowish-orange, orbits slightly darkened, greyish; lunule pale yellow; jowls yellow; all antennal segments and palps black; mesonotum mat black, scutellum largely black, narrowly yellow centrally; side of thorax largely black, humerus and notopleural area faintly paler; legs black apart from faintly yellowish

fore-knees; abdomen and halteres entirely black; squamae dark grey, margin and fringe black.

Male genitalia. Unknown.

Material. Holotype ♀, Aysen, Puerto Cisnes, 70° 40' W, 44° 45' S, 1.—15. II. 61 (PEÑA); paratype ♀, same data. Holotype in CNC, paratype in AC.

Remarks. This is one of the darkest species known in the genus in the New World (although black species are also known in Australia, see SPENCER 1977). It is felt justifiable to describe the species even in the absence of a male in view of its distinctive colour and large size and in due course there will be no difficulty in associating a male from the same area with the holotype.

*Phytoliriomyza frontalis* sp. n. (fig. 95, p. 32)

Head (fig. 95). Frons broad, 3 times width of eye, conspicuously projecting above eye in profile; 2 equal, reclinate ors (lower missing on both sides but detectable from basal pits); orbital setulae lacking; eye small, slanting; jowls deeply extended at rear, 2/3 height of eye; third antennal segment elongate, rounded at end.

Mesonotum. 3+1 strong dc, acr lacking.

Wing. Length in female 2.6 mm, last section of vein M 3+4 1½ times length of penultimate.

Colour. Frons largely dark brown, becoming more yellowish towards lunule; orbits paler, yellowish; jowls, face, and palps yellow; third antennal segment brownish-black, first and second yellow; mesonotum entirely mat, greyish-brown, with faintly darker bands along line of dc; scutellum largely dark, narrowly yellowish centrally; side of thorax uniformly greyish-black, apart from notopleural triangle and humerus which are faintly yellowish; legs basically yellow but variably darkened on upper side, all femora yellowish at knees; abdomen mat black; wings faintly brownish, squamae pale grey, margin dark, fringe yellowish-ochrous; halteres whitish-yellow.

Material. Holotype ♂, Santiago, Rincoñada Maipú, 450 m, 33° 31' S, 70° 47' W, 18. V. 66 (Malaise) (N. HICHINS & M. E. IRWIN), in CAS.

Remarks. This species is instantly identifiable by the elongate third antennal segment. Both in head shape and colour it is remarkably similar to *P. pallidicentralis* (Malloch) from Australia (cf. SPENCER 1977: fig. 254). It will be of the utmost interest, when a male of *P. frontalis* is discovered, to see whether this resemblance is merely the result of fortuitous convergence or reflects close relationship.

*Phytoliriomyza magellani* sp. n. (figs. 103—105, p. 33)

Head. Frons 1½ times width of eye, not projecting above eye in profile; 2 ors, 2 equal and similar ori; orbital setulae sparse, 3 or 4 hairs reclinate in area of ors, a single one proclinate below lower ori; jowls 1/3 height of eye, this only slightly slanting, third antennal segment small, round.

Mesonotum. 3+1 dc, acr lacking.

Wing. Length in male 2.3 mm, discal cell large, last section of vein M 3+4 only slightly longer than penultimate, in ratio 22:19.

Colour. Frons, jowls and face bright yellow; upper orbits darkened to lower ors, both vertical bristles on dark ground; all antennal segments yellow but third somewhat darker, orange; palps brownish, more yellow towards base; mesonotum mat, blackish; rear of humerus, notopleural area and upper margin of mesopleura bright yellow, side of thorax otherwise black; scutellum yellow centrally; legs black but femora with all knees yellow; squamae yellowish, margin and fringe black; halteres bright yellow.

Male genitalia. Aedeagus as in figs. 103, 104; sperm pump with blade triangular, moderately pigmented, base well developed; epandrium (fig. 105) strongly sclerotized along inner margin, with strong spine-like projection at midpoint, no surstyli.

Material. Holotype ♂, Magallanes, Tierra del Fuego, Estancia Cameron, S. E. of Bahia Inutil, 4.—6. XII. 60 (PEÑA); paratypes: Valparaiso, Las Ventanas, 2 ♂♂, 5 ♀♀, 3. August 1960 (L. CAMPOS, L. CALTAGIRONE). Holotype in CNC, paratypes in UChS and AC.

Remarks. Superficially this species could be mistaken for a *Liriomyza*, with both the third antennal segment and scutellum yellow. However, the lack of the stridulating mechanism and the distinctively sclerotized epandrium (fig. 105) indicate its correct position in *Phytoliriomyza*.

*Phytoliriomyza mucarensis* sp. n. (figs. 97—99, p. 32)

Head. Frons broad, twice width of eye, not projecting above eye in profile; 2 ors, 2 ori, orbital setulae sparse, reclinate; jowls angular, extended at rear, 1/3 height of eye; third antennal segment small, round.

Mesonotum. Normally 3+1 dc, occasionally 2+1 on one side; acr sparse, in 2 rows, not reaching level of 2nd dc.

Wing. Length 2.3 mm; discal cell large, last section of vein M 3+4 only twice length of penultimate.

Colour. Frons orange-yellow, orbits black; entire hind-margin of eye and all antennal segments black; mesonotum entirely mat grey; notopleura and humerus bright yellow, pleura otherwise black; scutellum yellow centrally; legs largely black, knees only narrowly and indistinctly yellow; squamae yellowish-grey, margin and fringe black.

Male genitalia. Aedeagus as in figs. 97, 98; sperm pump with narrow stalk, widening blade and well-developed base; epandrium heavily sclerotized along inner margin (fig. 99).

Material. Holotype ♂, Antofagasta, Mucar, on Argentine border, 4000—4100 m, 12.—16. XII. 65 (PEÑA) paratypes: 3 ♂♂, 2 ♀♀, same data. Holotype and paratypes in CNC, 2 paratypes in AC.

Remarks. The male genitalia indicate that this species is most closely related to *P. magellani*, despite the differing colour of the third antennal segment.

*Phytoliriomyza nigrescens* sp. n. (figs. 100—102, p. 32)

Head. Frons broad, twice width of eye, slightly projecting above eye towards antennae; orbital bristles strong, 2 ors, 2 ori, orbital setulae sparse, upright or reclinate; jowls angular, almost 1/2 height of eye at rear; third antennal segment small, round.

Mesonotum. 3+1 strong dc, acr in 3 or 4 rows.

Wing. Length 2.4—2.5 mm; discal cell large, last section of vein M 3+4 1½ times penultimate.

Colour. Frons and jowls dark yellowish, orbits, all antennal segments and palps black; mesonotum mat, blackish grey; scutellum variable, from entirely black to faintly or distinctly yellow centrally; rear of humerus and notopleural area yellow, pleura otherwise black; legs entirely black; squamae dark grey, margin and fringe black; abdomen uniformly black.

Male genitalia. Aedeagus as in figs. 100, 101, distiphallus divided distally in 2 distinct tubules; sperm pump strongly pigmented, with broad stalk and blade scarcely widening; epandrium (fig. 102) with 2 strong projections towards hind-corner, a single projection and 2 longer hairs at front corner (representing surstylus).



Material. Holotype ♂, Antofagasta, Puripicar, S. E. of Quisquiro Salt Lake, 4000—4200 m, 9.—12. XII. 65 (PEÑA); paratypes: 2 ♀♀, same data. Holotype and paratype in CNC, one paratype in AC.

Remarks. This is the darkest species in the genus known in Chile, with comparably dark species only known in Australia (SPENCER 1977).

*Phytoliriomyza nublensis* sp. n. (figs. 106, 107, p. 33)

Head. Frons  $1\frac{1}{2}$  times width of eye, not projecting above eye; 2 ors, 1 ori, orbital setulae proclinate; eye large, conspicuously slanting, jowls  $\frac{1}{4}$  height of eye at rear; third antennal segment small, round, arista long, only slightly pubescent.

Mesonotum. 3+1 dc, acr sparse, in 2 rows in front.

Wing. Length from 1.6 mm in male to 2.0 mm in female; last section of vein M<sub>3+4</sub> from slightly less to slightly more than twice length of penultimate.

Colour. Frons yellowish-orange, orbits not darkened; jowls, face and palps yellow; third antennal segment largely yellow, at most slightly darkened; mesonotum and scutellum uniformly mat grey; side of thorax predominantly yellow, apart from lower third of mesopleura and most of sternopleura; legs: femora yellowish, with irregular darker striations, tibiae and tarsi more brownish; halteres largely yellow but knob sometimes distinctly darkened above.

Male genitalia. Aedeagus a long, rather broad tubule, curving dorsally towards apex (fig. 106); sperm pump with moderate sized blade (larger than in *P. arctica*); hypandrium rounded, U-shaped; surstyli discrete, with several long bristles (fig. 107).

Material. Holotype ♂, Nuble, 40 km E. of San Carlos, 23. XII. 50 (ROSS & MICHELBA-CHER); paratypes: 1 ♂, 3 ♀♀, same data; Malleco, Ancud, 1 ♂, 1. I. 51 (ROSS & MICHELBA-CHER); Concepcion, Salto del Loja, 20 m, 1 ♂, 8. XI. 66 (E. I. SCHLINGER, M. E. IRWIN), Holotype and paratypes in CAS, 2 paratypes in AC.

A female from Santiago, Los Maitenes, 1400 m, 18. IX. 54 (L. PEÑA) possibly represents this species but is not included as a paratype.

Remarks. The proclinate orbital setulae (cf. fig. 96) and the elongate distiphallus associate this species with *P. arctica* and the two can only be reliably separated by the male genitalia.

5.8. Genus *Phytomyza* Fallén

*Phytomyza cameronensis* sp. n. (figs. 115, 116, p. 36)

Adult. Closely resembling *P. meridialis*, with following points of difference: frons uniformly bright yellow, slightly less projecting above eye; eye more slanting; wing length in male 2.5 mm, second costal section only slightly less than 3 times length of fourth.

Male genitalia. Aedeagus as in figs. 115, 116.

Material. Holotype ♂, Magallanes, Tierra del Fuego, Rusphen, 30 km S. E. of Cameron, 20.—30. XI. 60 (L. PEÑA), in CNC.

Remarks. Despite the general similarity between this species and *P. meridialis*, the male genitalia of the two are entirely different.

*Phytomyza meridialis* sp. n. (figs. 117, 118, p. 36)

Head. Frons broad, twice width of eye, distinctly projecting above eye in profile; 2 ors, 1 ori, all approximately equal, orbital setulae sparse, in single row; eye small, round; gena broad,  $\frac{2}{3}$  height of eye, cheek forming broad ring below eye;

third antennal segment rounded, slightly longer than broad, arista slender, with only weak pubescence.

Mesonotum. 3+1 strong dc, acr sparse, in 2 rows.

Wing. Length from 2.3 mm in male to 3.0 mm in female; second costal section approximately  $2\frac{1}{2}$  times length of fourth.

Colour. Frons yellowish but variably darkened, brownish, behind; jowls and face bright yellow; hind-margin of eye and palps black; mesonotum and scutellum uniformly mat, greyish-black, side of thorax largely similar, only upper margin of mesopleura narrowly yellow; legs black, all knees slightly yellowish, more distinctly so on fore-legs; squamae yellowish-grey, margin and fringe black.

Male genitalia. Aedeagus as in figs. 117, 118.

Material. Holotype ♂, Magallanes, Tierra del Fuego, Rusphen, 10 km S.E. of Cameron, 20.—30. XI. 60; paratypes: 5 ♂♂, 2 ♀♀, same data (all PEÑA); Aysen, Puerto Cisnes, 72° 40' W, 44° 45' S, 1 ♀, 1.—15. II. 61 (PEÑA). Holotype and 5 paratypes in CNC, 2 paratypes in CAS, 3 in AC.

Remarks. Although this species occurs together with *P. cameronensis* on Tierra del Fuego, the male genitalia suggest that it is most closely related to *P. enigma* (figs. 111, 112) which is so far only known further north from Chiloe to Santiago.

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